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The Gas Piping of the Greenpoint (N. Y.) Hospital, and Some Other Mention Connected Therewith.

[Prepared for the JOURNAL, by MR. C. F. HERINGTON.]

Ground was broken a short time ago for a new Hospital in Brooklyn, which is to be located on Bullion street, between Kingsland avenue and Debevoise avenue. The structure, which is being erected by the Department of Public Charities, of which the Hon. Michael Drummond is Commissioner, is from the plans and specifications of Mr. Frank J. Helmle (Architect), of Brooklyn, and Mr. Frank Sutton (Engineer), of New York City.

One edifice consists of a main hospital building, power house and several smaller detached structures; but this description is confined to the main hospital building alone. The ground floor consists of the kitchen, help's dining rooms, office, waiting rooms, etc., a complete plan of the floor being shown in Fig. 1.

The first floor is divided into the men's ward, men's solarium, several dining rooms, diet kitchens, quiet rooms, parlors, nurses, doctors' and help's dining rooms and a woman's ward and solarium.

The second floor is almost as the first, in arrangement, with the exception that the internes' bedrooms, sitting rooms, toilets and baths are substituted in place of the dining rooms on the first floor.

The third floor is divided into a men's solarium, men's ward, women's solarium and women's ward, together with an assembly hall and platform.

On the fourth floor are placed separate solariums and wards for both men and women, with quiet rooms, a small ward and a roof garden.

The fifth floor (which extends only over part of the building) is entirely given over to surgical uses, being divided mainly into two operating rooms, around which are grouped etherizing rooms, recovery rooms, nurses, surgeons and staff rooms, a supply room and several toilets.

Gas lighting is provided throughout the building, numerous wall-brackets being provided on the posts in the cellar, while a complete plan showing all the gas lights on the ground floor is shown in Fig. 1. These lights are distributed approximately about the same on the first, second, third and fourth floors. All the wall-outlet fixtures, which are of the combination type, are similar to the little detail shown in Fig. 2, but on the fifth floor, in the operating room, special fixtures are used, consisting of four 100-watt lamps, with 6 gas burners having Bray tips, all as shown in detail in Fig. 3.

The gas piping installed is put in under the general requirements of the New York plumbing code, all wall-outlets being $\frac{3}{8}$-inch in size. The piping is of guaranteed wrought iron pipe—that is, 2 inches and larger in diameter being lap welded. The $\frac{1}{4}$ inch and $\frac{3}{8}$ inch sizes are of extra heavy grade, and that of $\frac{1}{2}$ inch and smaller is not used except in the cases mentioned above. All the pipe run in chases in the cement or concrete is thoroughly coated with pure asphaltum varnish, and, where it is unavoidable, to expose the pipes to freezing, they are covered with an insulating material.

The fittings used are beaded, galvanized, malleable iron for all sizes up to and including 2 inches. For all larger sizes the fittings are of heavy pattern, gray cast iron, galvanized. When reductions in pipe sizes are made, proper reducing fittings are used, as bushings are not permitted. The horizontal lines are connected to the risers with brass ground seat unions.

Drips are located at the meter in the cellar and at the base of all risers, consisting of pieces of pipe about 18 inches long and of two sizes larger than the pipe which is drained. Valves are placed at the meter and at the bases of all risers, and are of the brass gate type for all sizes up to 2 inches.

[For illustrations, see following page.]

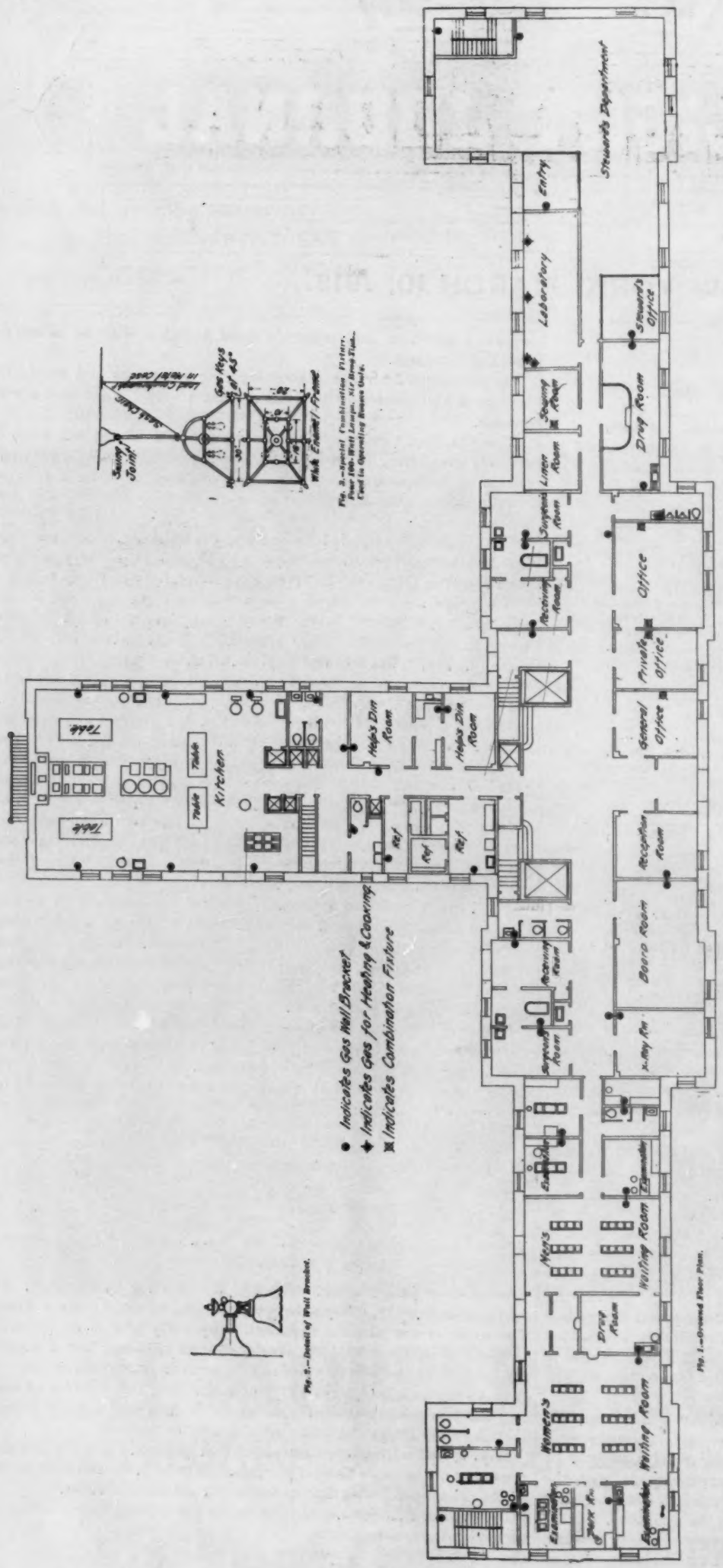
Making Sales.

[Prepared for the 15th Meeting, New York Section, "Gas Meeters," by MR. F. D. PEMBLETON.]

Sales never just happen. There is a cause for every effect. Directly or indirectly, every sale is the natural effect of a direct cause. The cause is not always apparent, frequently a sale or purchase seeming to be the result of a spontaneous impulse; but a careful analysis will show the impulse to be the result of certain causes. If these causes can be determined and controlled, the volume of sales and the degree of success of a salesman or firm will largely depend upon how skillfully the knowledge is used or applied.

Buying and selling constitute a mental process. If we are to find the cause of the impulse that prompts one to buy, we must study the fundamental principles that underlie our mental activities.

Dr. Walter Dill Scott, who is probably the highest living authority on psychology, says:



"We have been taught by tradition that man is inherently logical, that he weighs evidence, formulates it into a syllogism and then reaches the conclusion on which he bases his action. The more modern conception of man is that he is a creature who rarely reasons at all. Indeed, one of the greatest students of the human mind assures us that most persons never perform an act of pure reasoning, but that all their acts are the result of imitation, habit, suggestion or some related form of thinking. which is distinctly below that which could be called reasoning. Our most important acts are performed and our most sacred perceptions are reached by means of the merest suggestion."

Dr. Scott also states:

"We conceive of ideas as being nothing more than formal, inert reasons, and we assume that to secure action we must add to our ideas the activity of the will.

"As a matter of fact this conception of ideas is wrong and leads to error when we try either to interpret or influence human action. The modern scientific conception of psychology is that ideas are the most live things in the universe. They are dynamic and naturally lead to action. This dynamic, impulsive nature of ideas is expressed in the following law: Every idea of an action will result in that action unless hindered by an impeding idea or physical impediment."

And again:

"Every idea, concept or conclusion which enters the mind is held as true unless hindered by some contradictory idea."

In other words, man is extremely susceptible to and actuated by suggestion. Because of the dynamic nature of ideas, if you suggest to a man that he buy a certain article, he will act upon the idea and buy the article if he does not receive an idea to the contrary, or is not for some other reason prevented from buying. He will accept as true every statement regarding the value and usefulness of the article if contradictory ideas do not arise in his mind. Ideas contrary to the suggestion to buy and ideas of doubt are sure to arise in the mind of the prospective customer: Because of suggestion, born of instinct and habit; but these ideas of objection and doubt can be kept down to the minimum, and in most cases overcome, if you can anticipate them and, without mentioning them, suggest other ideas, which in turn will be contradictory to the ideas of objection and doubt. If, in addition to anticipating objections and suggesting ideas to offset the objections, you remember that ideas are dynamic in nature, and that the more vividly they are conveyed the more dynamic and more impulsive will be their force. You therefore, present the suggestions in an extremely vivid manner. The suggestions to buy are more likely to predominate over the suggestions to the contrary, and the impulse to buy is more likely to be acted upon.

The most dynamic and forceful of all ideas are those which express our emotions, our sentiments, our desires for health, comfort, material welfare and ultimate happiness. Therefore, when selling anything, if you present your arguments and suggestions in such a way as to appeal to the emotions or sentiments of the prospect, or if you convey to the prospect extremely vivid ideas of the

comfort, material benefit or ultimate happiness that he will receive through purchasing what you are selling, the impulsive force of these ideas will be greater than the ideas of objection. Then, if he believes what you say and can afford to buy what you are selling, he will in all probability buy it.

If, by your manner, you convey the idea that you possess a friendly interest and sympathetic feeling for the prospect, and if, by your frankness and a willingness to submit positive proof of your statements, you convey the idea that you are absolutely honest and trustworthy; and if, by what you say and the way you say it, you demonstrate very convincingly that you have absolute confidence in what you are selling, and confidence in yourself, you will dispel any idea of doubt that the prospect might have. He will believe all your statements regarding your proposition and the benefits he will derive from accepting it.

Assuming that thus far your work has been well done, if you then save him the trouble of making a decision by placing in front of him the contract and fountain pen and say: "Just write your name there please," the prospect will very likely sign the contract and the sale will be closed, unless the prospect is prevented from purchasing by causes beyond your influence.

The people of Germany, France, Italy and many other European countries have very pronounced national characteristics, customs and habits. For instance, Germans are proverbially stolid, phlegmatic, patient, painstaking and practical. Their requirements, their tastes, the kind and quality of goods they will buy, their manner of buying, are all clearly defined by long-established customs and habits which are modified only by varying degrees of wealth and social position. And so it is with the people of other foreign countries. They have pronounced national characteristics and customs, for which reason, when selling goods to these people exclusively, it is comparatively easy to determine the best sales plan to follow.

In this country, because of its cosmopolitan population, conditions are different. We have large numbers of people from many foreign countries, who have brought with them many of their national customs and habits. Then we have the mixed nationalities and the crossed-mixed nationalities as well as the descendants of the early settlers.

While large numbers of foreigners of the same nationality have settled in the same locality and have formed whole colonies in the large cities, and while sections of the country have customs peculiar unto themselves, there are no pronounced national customs to point the way to successful sales' methods.

There is, however, a condition that clearly defines and positively determines the sales' methods that must be followed by every salesman and every firm, if a high degree of success is to be obtained. In this country there are seven classes of people, namely: The very poor; the moderately poor; the great middle class; the upper middle class; the moderately rich; the very rich; and the multi-millionaires.

Generally speaking, the point of appeal varies with every one of these different classes of people. The education and training of the very poor class of people are such that their requirements and tastes are quite different from those of the better classes. Of staple goods they buy only actual necessities, and these are usually of the cheapest quality; with the very poor price is the principal factor. With the moderately poor these conditions steadily improve until this class gradually blends into the middle class of people whom Abraham Lincoln loved to call "The common people."

The great middle classes of people form the backbone of this country. They are the solid, staunch people, and from their ranks have risen some of the greatest men of commercial and political history. What they buy must be of good quality and sold at a fair price. They do not want a lot of extravagant fancies at extravagant prices, but a plenty of the necessities of life to make them comfortable and snug. Good, honest, goods at honest prices, and they will see to it that they get both.

With the upper middle class of people begin the refinements of trade. Here begin extravagant tastes, luxurious living and fastidious buying. From this class of people comes the first demand for finer raiment and more elegant shops.

These tendencies increase very rapidly with the next three classes, and reach their highest development with the ultra-fashionable and exceedingly well-to-do class of people who prefer to patronize the exclusive shops where no sign of any kind is shown over the door, where prices are never advertised, and where every outside garment shown is the only one of that particular pattern in existence.

Such are the conditions that every business man must meet. He must decide which class of customers he wishes to secure, and then everything about his store equipment and display must be selected and arranged to appeal to that particular class. And every member of his sales' force must possess sufficient strength of personality, education, refinement and tact to be able to deal successfully with the class of customer desired. Having decided which class of customer he wants to *secure*. a dealer has five different ways of securing them: Namely, advertising, window displays, interior display, sales' force and service.

As you probably know, Sears, Roebuck & Company, of Chicago, constitute a retail mail-order firm, selling all kinds of merchandise for the home, farm and factory. The firm has no outside salesmen. All of their goods are sold through catalogues and follow-up literature, mailed to prospective customers, who in turn send their orders by mail.

At the close of 1911 the assets of this firm were, in round numbers, $60,769,000. Their pay roll showed a total of 8,468 employees. According to the firm's official report, issued January 29, 1913, the total sales for the year 1912 amounted to $77,116,859. The increase in sales over 1911 was $13,004,665. The results obtained by this Company prove what can be accomplished through the selling power of advertising, if the advertising is of the right kind, and if it is used in the right way.

A department store in Baltimore had a men's hat department. As is customary the department received only its pro rata share of the newspaper advertising and show window display. The buyer of the department, being dissatisfied with the amount of sales, offered to give up his share of the newspaper advertising if he could have instead a permanent window display. That arrangement was made.

In six months, without any change in sales' force, and with no other form of advertising, the sale of the hat department had doubled, and to-day it is one of the best paying departments in the store. The increase in sales is due entirely to the selling power of constant, effective window display.

A few years ago it was a common thing to see in stores a sign reading, "If you don't see what you want, ask for it." At that time the front and top of the counters were wood, and on them shallow show cases were placed at intervals.

As you know all this has changed. In all modern stores the counters are composed almost entirely of all glass showcases. Wooden topped counters are placed only in certain departments. In addition to the counter, showcases are large, special display cases for the purpose of emphasizing the display of certain goods. The idea of display has been developed to the extent of giving an elaborate exhibition of gowns on living models who promenade before the customers.

These methods prevail in the department and smaller general stores. They are based upon the selling power of suggestion and the impulsive influence of imitation. In the highly developed specialty shops the modern tendency is in the opposite direction. Advertising and window displays are depended upon to bring customers into the store. Once inside they see no display at all. Along the sides of the store are beautifully finished cabinets. In these the goods are kept.

The customer is greeted at the door by a courteous salesman and escorted to a comfortable chair beside a table. Just one article, or piece of goods, is shown at a time. If the customer does not like the article, or is undecided, it is taken away and another one shown. At no time is more than one article shown if it can be avoided. These methods are based upon the first law of suggestion already mentioned.

The purpose is to concentrate the customer's mind on one object and to eliminate from the customer's mind ideas of comparison.

Not many miles from New York city is a certain department store that used to be managed by a high salaried superintendent and high grade aisle managers. Its sales' force was composed of bright, intelligent young people of about 20 years of age and upward. Many of them possessed a personality of more than ordinary attractiveness. At that time the store did a big business, and among its customers could be seen many of the well-to-do class. Then came a period of economizing.

The superintendent, aisle managers and most of the sales people were replaced with cheaper and inferior help. Many of the present sales' force are little more than children. As a result the sales' service furnished by the store is very unsatisfactory.

The decrease in the number of customers during shopping hours and the difference in the class of customers are very apparent to one

familiar with the history of the store. The lines of carriages and automobiles in front of the store during shopping hours are greatly reduced.

If we could see the records we no doubt would learn that the change in the class as salespeople has cost that store thousands of dollars. This is only one instance. Many others can be cited to prove that the personnel of the sales' force has a very positive influence to increase or decrease sales.

The owners of large department stores and the principal specialty shops spend large sums of money to equip their stores in a manner that will promote the physical comfort and appeal to the aesthetic tastes of their customers. The owners of these stores demand that, under all circumstances, the salespeople must be courteous and polite to customers. Great care is exercised to select salespeople who possess expert knowledge of the goods, and who can tactfully help customers select the goods best suited to their individual needs and means.

Expert buyers are employed and all the goods offered for sale must be of the best type and quality. Every article is guaranteed and if the customers so desire, their money is refunded without question. Complaints are received with courtesy, and every effort is made to satisfy the customer. The goods are neatly wrapped and carefully packed. A prompt delivery system is maintained at great expense. All these features make up what is termed service.

Why do the owners of these stores spend large sums of money to furnish their customers such service?

The answer is found in the psychological law that the most dynamic and forceful of all ideas are those which express our emotions, our sentiments, our desires for comfort, material welfare and ultimate happiness.

Each of the features mentioned helps to express these ideas. The combined features express these ideas in a very vivid manner, thus increasing their dynamic and impulsive force.

Because of these facts the service furnished by a store has a very positive influence on sales. The service pleases or displeases customers according to the degree of perfection with which each phase of it is performed. If most of the people who visit the store are intensely pleased with its service, they will come again; and they will talk with their friends about it. In this way the store becomes successful, and in time it not only acquires a reputation that gives it prestige and prominence, but a powerful influence to attract customers.

By employing the methods mentioned above many firms and individuals have actually made millions of dollars. Probably none of you doubt the truth of that statement; but do all of you realize its full import to this company, and to each of you individually?

Let me remind you that public service territory is located in the center of the most thickly populated part of the United States. The people therein are the most prosperous and the best buyers in the world. This company is selling service and appliances that are needed in every home. The company has an adequate sales' organization, and it is employing every one of the methods mentioned above; but the development of these methods to their highest degree of efficiency depends upon the individual efficiency of each man.

If you are intensely interested in your work, if you study and develop your maximum ability, and then if you constantly apply your ability with a high degree of enthusiasm, you, individually, will be highly efficient and sucessful.

Just as truly as sand on the bearings, or a broken cog on a wheel, will disable a piece of intricate machinery, so will friction and discord between departments and individuals reduce the efficiency of a large organization.

Because of the magnitude of the company, and the dependence of one department and one individual upon another, you will attain your maximum efficiency and success, only to the degree with which you co-operate with those with whom your work brings you in contact.

The efficiency of the company will be the sum total of the efficiency of all the individuals and all the departments. Therefore, the company as a whole will attain its maximum efficiency only to the degree to which all individuals and all departments work together as one team.

Because of the conditions surrounding all business transactions, every moment of your time and every one of your acts have a cash value to the company, and to you.

The extent to which you allow your work to fall below your maximum ability, to just that extent will the company and you lose money. So let us all do our best, and all work together all the time to promote the interests of the company and ourselves.

The Analysis of Water Gas Purification Material.

[Contributed by Mr. E. C. Uhlig, to the Proceedings, Seventh Annual Meeting, American Gas Institute.]

Determination of Sulphur.—The material used for the removal of hydrogen sulphide from illuminating gas is known under various names, such as oxide, iron oxide, iron mass, iron sponge. It consists of wood shavings mixed with hydrated iron sesquioxide, and the reactions occurring during the purification of the gas are probably those given in the "Proceedings," American Gas Institute, Vol. I., page 223:

$$Fe_2O_3.H_2O + 3H_2S = Fe_2S_3 + 4H_2O$$
$$\text{and } 2Fe_2O_3.H_2O + 6H_2S = 4FeS + S_2 + 8H_2O.$$

After the material has become foul it is revivified or reoxidized by exposure to the air. The reactions of this, according to the same authority, are probably—water eliminated:

$$2Fe_2S_3 + 3O_2 = 2Fe_2O_3 + 3S_2$$
$$12FeS + 9O_2 = 6Fe_2O_3 + 3S_2.$$

Each time the material is used a sample is sent in for analysis, thus the action is watched during the life of the oxide. There have appeared from time-to-time in chemical journals methods for the determination of sulphur which research was undertaken to ascertain the comparative value of these methods, having in view the adoption for routine work of a method which would give reasonably accurate results in the shortest space of time.

When the material arrives at the laboratory it is usually in such a saturated condition, due to moisture and tarry matter, that it must be dried before grinding. One hundred grams are weighted into a rectangular tin dish, and placed in a water jacketed drying oven, heated by a steam coil. The temperature is kept between 90° and 95° C., and when the material is dry enough for grinding the dish is removed and weighed. The loss of weight is water and light oils. It is unsafe to hasten the drying by raising the heat, as this will volatilize some of the free sulphur of the oxide, which is shown by the following experiment:

Five grams of pure powdered sulphur were weighed into a small beaker which was placed in the oven. A funnel was inverted over the beaker and supported by running the stem through a rubber stopper placed in the vent of the oven. The part of the stem outside the oven was attached to a wide glass tube acting as an air condenser. The oven heat was maintained at 96° to 98° C. for 3 days, at the end of which period the beaker was weighed. The 5 grams of sulphur had lost 0.0113 gram in weight, and there was some sulphur sublimed on the condenser tube. This was a loss of 0.22 per cent., and may be considered unavoidable. The dried mass is next ground, in an ordinary drug or coffee mill, and the grinding repeated until it is as fine as possible. By bringing the grinding surfaces closer each time it is possible to reduce the mass almost to powder.

All the methods of analysis are based on the oxidization of the sulphur and its precipitation as barium sulphate. The methods differed in the manner in which the oxidation was effected. All the reagents employed were tested and found free from sulphur. The distilled water was the product of a continous steam still, redistilled in a tin lined copper retort with block tin condenser. It was also found free from sulphur.

The manner of precipitating the barium sulphate was the same in all methods. A 10 per cent. solution of barium chloride was added from a burette (one cc. at a time) to the boiling solution. The boiling was continued for 10 minutes after the last of the reagent had been added, and the solution allowed to stand over night. Where the precipitation was done in the presence of iron the barium sulphate was washed with hot, 5 per cent, hydrochloric acid, until the washings gave no reaction with potassium ferrocyanide, and then with hot water until no reaction was obtained with silver nitrate. It was found that the ignited barium sulphate was liable to be contaminated with iron when the hydrochloric acid washing was omitted. The methods of analysis employed were as follows:

1. *Aqua Regia Method, as used in Iron Analysis.*—Weigh 1 gram of the sample into a 200 cc. Erlenmeyer flask, place a short-stem funnel in the mouth and add 15 cc. concentrated nitric acid. Then add 1 cc. concentrated hydrochloric acid and place flask on a hot-plate. From time-to-time when the action ceases add 1 cc. hydrochloric acid. When action has finally ceased remove the funnel and add 2 to 3 grams of dry sodium carbonate, wash off the funnel and evaporate to dryness. Cool, and add 30 cc. hydrochloric acid, and evaporate again to dryness. Take up with 50 per cent. hydro-

chloric acid, boil and filter. Wash thoroughly with hot water and precipitate with barium chloride. The undecomposed material on the filter paper is dried and fused with equal parts of sodium carbonate and sodium nitric. Boil the fusion in water, filter, wash, acidulate the filtrate with hydrochloric acid; boil off the carbon dioxide and precipitate with barium chloride.

2. *Fuming Nitric Acid Method.*—Digest 1 gram with 50 cc. fuming nitric acid in a 200 cc. Erlenmeyer flask, and evaporate on hotplate or sand bath to ¼ its volume. Add cautiously 3 grams potassium chlorate and evaporate to dryness. Bake on hotplate for ½ hour. Cool and add 30 cc. of 50 per cent. hydrochloric acid. Boil and filter. Wash with hot water and precipitate as described above. The undecomposed matter is to be fused and treated as described in the aqua regia method.

3. *Sodium Hydroxide Method.*—Boil 1 gram in a porcelain casserole with 50 cc. of a saturated solution of sodium hydroxide. Wash into a 500 cc. fluid and add sufficient crystals of potassium permanganate to give a red color. Add 100 cc. of concentrated hydrochloric acid, boil off the chlorine, dilute with water and filter. Wash, filter and precipitate filtrate as above.

4. *Fusion Method as Used for Sulphur in Coal.*—One gram of sample was mixed with 10 grams of sodium carbonate and 10 grams of sodium nitrate. The mixture was well ground in a porcelain mortar, and transformed little by little to a redhot platinum crucible. The crucible was well covered at each addition, and kept covered until the contents were in a state of quiet fusion. The contents of the crucible were boiled in water, acidulated with hydrochloric acid and evaporated to dryness. Taken up with hydrochloric acid and filtered. The filtrate was precipitated with barium chloride.

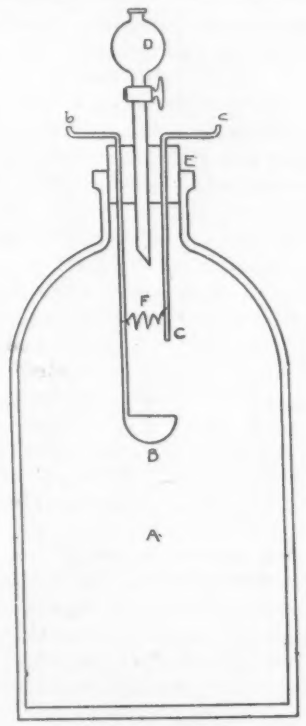
5. *Eschka's Method.*—Mix 1 gram in a large platinum crucible with 10 grams calcined, powdered, magnesite, and 5 grams dry sodium carbonate, cover with a little of the mixture, and heat gently for about 30 minutes, then increase the heat until the crucible is redhot, and continue heating with occasional stirring until no black particles remain. Empty the crucible into a 200 cc. beaker and wash it with hot water into the beaker. Add sufficient water to make the volume about 100 cc. and boil about ½ hour. Filter and wash three times by decantation with hot water. Add to the filtrate a slight excess of bromine water, make acid with hydrochloric acid, boil and precipitate with barium chloride.

6. *Combustion in a Calorimeter Bomb.*—Mix 1 gram in the bomb of a Parr calorimeter with 2 grams of finely powdered potassium chlorate, and 10 grams of sodium peroxide. Adjust the firing wires, screw on the cap, and place the bomb in a beaker of water. Effect the combustion by means of the electric spark, as usual, and, when the bomb is cool enough to handle, unscrew the cap and wash out the contents with *cold* water into a 150 cc. beaker. Acidify with hydrochloric acid, boil and filter. Precipitate the filtrate with barium chloride, as usual. Fuse the undecomposed part as under aqua regia method.

Modification of this Method.—Contents of bomb were boiled with water and filtered. Insoluble part boiled with 25 per cent. hydrochloric acid and filtered, part remaining undecomposed was fused as under aqua regia methed. Sulphur was determined in each part.

7. *Graefe's Method.*—Weigh ½ gram onto a 9 cm. filter paper. Fold the paper around the sample and place it in the combustion spoon (*B*). Fasten a piece of cotton string from the paper to the firing wire (*F*), and place the whole in the 8-liter bottle (*A*) which contains oxygen. Firmly fasten the stopper (*E*) with the clamp, and connect (*c* and *b*) with an electric battery. When the sample has finished burning place the bottle under a tap and cool by running water over the surface. When cool add 50 cc. of 10 per cent. solution of sodium peroxide by means of the funnel (*D*). Remove the stopper (*E*) and wash the combustion spoon (*B*) into a 500 cc. beaker. Pour about 100 cc. water into the bottle, shake it around so as to wet the inside surface and pour it into the beaker. Wash the bottle several times with small volumes of water, pouring the water each time into the beaker. With care the washings may be kept down to a volume of 300 cc. Filter, acidify with hydrochloric acid, boil and precipitate with barium chloride.

8. *Extraction with Carbon Disulphide.*—Weigh 1 gram onto a filter paper. Wrap the paper around the sample and place in a Soxhlet extractor, having previously weighed the flask. Extract with pure, recently distilled, carbon disulphide until colorless. Remove the flask and distill off the carbon disulphide, expelling the last traces with a current of filtered air. Weigh the flask; the increase of weight is sulphur and tar. Oxidize the contents of the flask



Graefe Apparatus.

with fuming nitric acid, and determine the sulphur as usual; the weight of sulphur subtracted from the weight of the contents of the flask gives the tar. This method gives only the free sulphur. To determine the condition of the remaining sulphur the method was carried further as follows:

The filter paper and contents were placed in an evolution flask and treated with dilute hydrochloric acid, the evolved gas being absorbed in bromine in a 10-bulb Meyer tube. This gave the sulphur present as sulphide. The solution in the flask was filtered from the undecomposed matter, oxidized with bromine and the sulphur determined. The insoluble matter, remaining was fused as described above under aqua regia method.

9. *Lunge's Method as Given in Technical Methods*, Part 1, Vol. I., p. 270.—Weigh 0.5 gram into a porcelain boat and place same in a glass combustion tube, which is connected to bulbs containing bromine. The combustion was effected in a current of moist oxygen. The sulphur absorbed by the bromine was determined.

Results of Analyses.—Oxide No. 1. Sulphur determined by the following methods:

Results of Analyses.

Oxide No. 1. Sulphur determined by the following methods: Aqua regia; sodium hydroxide; fusion; bomb; Graefe; Eschka.

			Fusion		
Method.	Aqua Regia.	Sodium Hydroxide.	a.	b.	c.
Sulphur in sol....	23.040	23.114	23.08	23.23	22.62
Sulphur in res...	0.038	Not deter	None	None	None
Sulphur total....	23.078	23.114	23.08	23.23	22.62

	Bomb			
Method.	a.	b.	Graefe.	Eschka.
Sulphur in sol.....	22.738	23.023	22.676	21.359
Sulphur in res.....	0.213	0.115	Not deter.	Not deter.
Sulphur total.....	22.951	23.138	22.676	21.359

All of the above methods, with the exception of Eschka's, give quite close results, This method gives very accurate results when used for the determination of sulphur in coal, and the low figure obtained may be due to some sulphur escaping during the heating. The question was not gone into further, because the method is not quite suitable for laboratory routine work where many determinations must be done. The sodium hydroxide and fusion methods are accurate but rather too troublesome for routine work.

The bomb and Graefe's method are quite accurate and rapid, the solution being ready for precipitation in an hour after weighing out the sample in Graefe's method, and in about ½ that time in the bomb method.

The aqua regia method is accurate, but the evaporation consumes much time. It was thought that the evaporation might be dispensed with. This was tried, with the following results on the same oxide:

Analysis.	1.	2.	3.	4.
Sulphur in solution.	23.832	23.134	22.008	23.569
Sulphur in residue.....	0.151	0.652	1.804	None
Total sulphur	23.983	23.786	23.812	23.569

These results are all higher than when the solution was evaporated to dryness, the difference being due to silica which precipitated with the barium sulphate. There were evidences of flocculent silica in the solutions before precipitation. The silica was determined in fusion method, sample *b*, above, and was found to be 2.01 per cent. The following was tried on a sample of a different oxide: Methods—Fuming nitric acid; Graefe; extraction method; Lunge method.

Results of Analyses. Oxide No. 2.

Method.	Fuming Nitric Acid.	Graefe. a.	Graefe. b.
Sulphur in solution	20.60	20.42	20.54
Sulphur in residue	None	Not done	0.06
Total sulphur	20.60	20.42	20.60

Method.	Extraction.	Lunge.
Sulphur extracted	18.49	Sulphur driven off by heat and absorbed in 18.72 bromine.
Sulphur evolved by HCl	0.11	
Sulphur in combination, soluble in HCl	0.38	
Sulphur in residue	1.59	Remaining sulphur not determined.
Total sulphur	20.57	

The above shows that the Graefe and fuming nitric acid methods give practically the same results. The extraction method is very slow and this particular extraction consumed 2 days before the carbon disulphide was colorless; this was probably due to the tarry matter which was found to be 10.71 per cent. The Lunge method was quite rapid, the solution being ready for precipitation in a little over an hour.

As the object of the analysis of purification material is to determine the sulphur which is removed from the gas it will be seen that the total sulphur in the oxide is wanted, irrespective of the state of combination, therefore, the extraction and Lunge methods do not give the information desired, but rather the percentage of free sulphur. These 2 methods would seem suitable where the oxide is sold for its free sulphur content. This, however, is not the question here. The information sought is: What work is the oxide doing? This question, as stated above, involves the total sulphur.

Of all the methods considered that of the bomb gives accurate results with the least expenditure of time. There is, however, the question of initial cost. In this laboratory oxide samples are analyzed in batches of from 9 to 15 and the use of 1 or even 2 bombs would be slow work. and it would be costly to have a bomb of the Parr type for each sample. Another consideration is the question of the bomb bursting and injuring the operator. This has not yet happened, but when fired in oxide analysis the bomb has been seen to jump about an inch from the table indicating possibilities of danger.

The Graefe method, while taking longer than the bomb method, gives results sufficiently accurate, and the initial cost is quite low. The apparatus may be assembled from materials usually found in laboratories. The apparatus as sold includes a wire cage in which the bottle is placed during the combustion. This protects the operator in case of a bursting bottle. In the 100 or more determinations which we have done by this method only once did the bottle burst and the cage prevented injury to the operator. This bursting was caused by a globule of melted iron falling from the firing wire and cracking the bottom of the bottle, the pressure bursting the cracked bottle. This has been prevented by covering the bottom with water to cool the hot metal globules when they fall from the wire.

I have found that for routine work the solution of the products of combustion in water is sufficiently accurate. When the insoluble part was treated with hydrochloric acid no sulphur was found in the solution. The undecomposed part may be disregarded.

To settle the question of sulphur present originally in the oxide, a sample of new material was tested both by the fuming nitric acid and Graefe's methods with following results:

Method.	Fuming Nitric Acid.	Graefe.
Sulphur in solution	0.298	0.343
Sulphur in residue	None.	None.
Total sulphur	0.298	0.343

The filtering, igniting and weighing of the barium sulphate are time consuming operations, and some rapid method was desirable. This has been found in the use of the Jackson turbidimeter. The method employed is essentially that described in the "Journal of Industrial and Engineering Chemistry," Vol. 3, page 553. The tables given here are copied from Dr. Jackson's calculations in that article. The method which we use is as follows:

Weigh 0.5 gram and burn it in oxygen as described. When combustion is finished cool the bottle under the tap and run in carefully 50 cc. of 10 per cent. solution of sodium peroxide, manipulating the funnel so that this solution falls drop-by-drop on the residue in the combustion spoon. Remove the stopper and wash the spoon into a 500 cc. beaker. Empty the bottle into the beaker and wash the bottle with successive small volumes of water. With care the solution and washings need not exceed 300 to 400 cc. Add a drop of phenol phthalein to the contents of the beaker and add 50 per cent. hydrochloric acid until nearly neutral, about 15 cc. will be required. Bring the solution to boiling to drive off carbon dioxide and filter into a 500 cc. graduated flask. Wash 3 times with cold water and cool the flask under the tap. When cool dilute to the mark and mix well. With a pipette take out 10 cc. or more depending on how long the oxide has been in use, and run this into a 100 cc. Nessler jar. Add cold water to about 75 cc. and add a drop of methyl orange. Run in sufficient, ¼ normal hydrochloric acid to make slightly acid—about 3 drops will be found sufficient—and add a 1 gram barium chloride tablet. Dilute to the mark with water and set aside, with occasional shaking as described by Jackson, until the tablet is dissolved. Adjust the candle flame under the turbidimeter tube, pour in the contents of the Nessler jar and observe the reading where the candle flame is obscured. The table gives the milligrams of sulphur present in the 100 cc., and from this the per cent. of sulphur is calculated. The average of 5 readings is taken for this result.

Turbidimetric Sulphur Table.—For Use with Jackson's Candle Turbidimeter.—Sulphur Contained in 100 *cc.—Precipitated.*

Depth cm.	S. mg.	Depth cm.	S mg.	Depth cm.	S. mg.	Depth cm.	S mg.	Depth cm.	S. mg.
1.0	20.0	5.9	3.20	10.7	2.03	15.5	1.59	20.3	1.29
1.1	18.0	6.0	3.15	10.8	2.02	15.6	1.58	20.4	1.28
1.2	16.5	6.1	3.11	10.9	2.01	15.7	15.7	2.05	1.28
1.3	15.0	6.2	3.07	11.0	2.00	15.8	1.56	20.6	1.27
1.4	13.5	6.3	3.03	11.1	1.98	15.9	1.56	20.7	1.26
1.5	12.5	6.4	2.99	11.2	1.97	16.0	1.56	20.8	1.26
1.6	11.2	6.5	2.95	11.3	1.95	16.1	1.55	20.9	1.25
1.7	10.0	6.6	2.92	11.4	1.94	16.2	1.54	21.0	1.25
1.8	9.5	6.7	2.88	11.5	1.93	16.3	1.54	21.1	1.24
1.9	9.8	6.8	2.85	11.6	1.92	16.4	1.53	21.2	1.23
2.0	8.5	6.9	2.82	11.7	1.91	16.5	1.53	21.3	1.23
2.1	8.0	7.0	2.79	11.8	1.90	16.6	1.52	21.4	1.22
2.2	7.6	7.1	2.76	11.9	1.89	16.7	1.52	21.5	1.21
2.8	7.3	7.2	2.73	12.0	1.88	16.8	1.51	12.6	1.21
2.4	8.0	7.3	2.70	12.1	1.87	16 9	1.50	21.7	1.20
2.5	6.7	7.4	2.67	12.2	1.86	17.0	1.50	21.8	1.20
2.6	5.6	7.5	2.64	12.3	1.85	17.1	1.49	21.9	1.19
2.7	6.3	7.6	2.61	12.4	1.84	17.2	1.49	22.0	1.18
2.8	6.1	7 7	2.59	12.5	1.83	17.3	1.48	22.1	1.18
2.9	5.9	7.8	2.56	12.6	1.82	17.4	1.47	22.2	1.17
3.0	5.7	7.9	2.54	12 7	1.81	17.5	1.47	22.3	1.16
3.1	5.5	8.0	2.51	12.8	1.80	17.6	1.46	22.4	1.16
3.2	5.4	8.1	2.49	12.9	1.79	17.7	1.45	22.5	1.15
3.3	5.2	8.2	2.47	13.0	1.78	1.78	1.44	22.6	1.15
3.4	5.1	8.3	2.84	13.1	1.77	17.9	1.44	22.7	1.14
3.5	5.0	8 4	2.42	13.2	1.76	18.0	1.43	22.8	1.13
3.6	4.85	8.5	2.40	13.3	1.75	18.1	1.43	22.9	1.13
3.7	4.75	8.6	2.38	13.4	1.74	18.2	1.42	23.0	1.12
3.8	4.64	8.7	2.36	13.5	1.73	18.3	1.41	23.1	1.11
3.9	4.52	8.8	2.34	13.6	1.73	18.2	1.41	23.2	1.11
4.0	4.43	8.9	2.32	13.7	1.72	18.5	1.40	23.3	1.10
4.1	4.33	9.0	2.38	13.8	1.71	18.6	1.40	23.4	1.09
4.2	4.24	9.1	2.28	13 9	1.70	18.7	1.39	25.5	1.08
4.3	4.16	9.2	2.26	14.0	1.70	18.8	1.38	23.6	1.07
4.4	4.08	9.3	2.25	14.1	1.69	18.9	1.38	23.7	1.06
4.5	4.00	9.4	2.23	14.2	1.68	19.0	1.37	23.8	1.06
4.6	3.93	9.5	2.21	14.3	1.67	19.1	1.37	23.9	1.05
4.7	3.86	9.6	2.19	14.4	1.66	19.2	1.36	24.0	1.05
4.8	3.79	9.7	2,18	14.5	1.66	19.3	1.35	24.1	1.04
4.9	3.72	9.8	2.16	14.6	1.65	19.4	1.35	23.2	1.03
5.0	3.66	9.9	2.15	14.7	1.64	19.5	1.34	24.3	1.03
5.1	3.60	10.0	2.13	14.8	1.63	19.6	1.34	24.4	1.02
5.2	3.54	10.1	2.11	14.9	1.62	19.7	1.33	24.5	1.02
5.3	3.49	10.2	20.2	15.0	1.61	19.8	1.32	24.6	1.01
5.4	3.43	10.3	2.09	15.1	1.61	19.9	1.32	24.7	1.01
5.5	3.38	10.4	2.07	15.2	1.60	20.0	1.31	24.8	1.00
5.6	3.32	10.5	2.06	15.3	1.60	20.1	1.30	24.9	1.00
5.7	3.28	10.6	2.04	1.54	1.59	20.2	1.30	25.0	1.00
5.8	3.24	....	....	....	....	....	....	....	....

Results obtained by Jackson's turbidimeter using solution from Graefe's method. Aliquot parts taken from same flasks:

Oxide No.	3	4	5	6	7	8	9
Gravimetric sulphur	22.78	24.03	22.69	31.45	22.26	2I.41.	5.92
Turbidimetric surphur	22.50	24.20	22.40	30.70	27.60	22.10	5.32

The boiling-off carbon dioxide above was found necessary, because if omitted high results are obtained as shown by the following where the boiling was omitted: Oxide No. 10, different aliquot parts taken from flask and sulplur determined both ways.

Part.	a.	b.	c	d.	e.	Averages.
Gravimetric sulphur.....	24.61	24.57	24.30	24.18	24.68	24.468
Turbidimetric sulphur....	26.40	26.70	26.10	25.90	26.70	26.360

I desire to express my thanks to my assistants (Messrs. J. R. Brierly and Joseph Jares) for check analyses done in connection with this work.

The determination of Tarry Matter in Water Gas Purification Material.—We have used 2 methods, viz.:

1. Weigh 10 grams of the dried material into a weighed soxhlet cartridge, that has been previously extracted with carbon disulhide, place same in an extraction apparatus and extract with carbon sulphide until the solvent is colorless. Remove the cartridge, allow it to dry, at first spontaneously, and finally in a current of dry air. Weigh the cartridge. The loss will be tar plus soluble sulplur. Weigh 2 grams of the material remaining in the cartridge and determine the sulphur in it. This gives the fixed or insoluble sulphur. We now have:

Total sulphur as determined on an unextracted portion minus the fixed sulphur above gives the soluble sulphur. Tar plus soluble sulphur, minus soluble sulphur, gives the tar.

2. Weigh 2 grams onto an 11 cm. filter paper, fold the paper and place it in an extraction apparatus. Weigh the flask of the apparatus and extract with carbon disulphide until colorless. Remove the flask and distill off the carbon disulphide. Expel the last traces with a current of dry air. Weigh the flask. This gives the tar plus soluble sulphur. Determine the sulphur by oxidation with fuming nitric acid and precipitation with barium chloride. This result deducted from the previous one gives the tar.

The second method (above) consumes less time than the first. In both methods it is necessary to inclose the material so the woody portion cannot float in the solvent and be carried down to the flask. This is done by placing a wad of cotton in the cartridge in the first method, and in the second method by tightly wrapping the material in a filter paper. The extraction of this material and subsequent determination of the sulphur are time consuming operations, and it was thought that some solvent could be obtained which would remove the tarry matter and leave the sulphur behind. The following were tried: Carbon tetrachloride, toluol, petroleum ether (sp. gr. 0.636), acetone and ether. Before beginning the extraction it was thought advisable to make comparative qualitative experiments on the solubiiity of sulphur in the solvents. This was done by treating 1 gram of resublimed sulphur in a test tube with about 20 cc. of each solvent. The following were the results:

Carbon disulphide completely dissolved the sulphur in the cold. Carbon tetrachloride partially dissolved the sulphur on boiling. Toluol completely dissolved the sulphur on boiling.

Petroleum ether, acetone and ether, all partially dissolved the sulphur on boiling.

This diposed of the attempt to extract tarry matter without at the same time removing the sulphur from the material, and it only remained to find a solvent which would take the place of carbon disulphide which is somewhat dangerous to use on account of its inflammability. The qualitative tests having shown that sulphur was partially soluble in all the solvents it was evident that, if the extraction process were continued long enough, all the sulphur would be removed and possibly all the tarry matter.

As petroleum ether and ether are also very inflammable there was no advantage in their use, and there remained only, carbon tetrachloride, acetone, and toluol. As a matter of interest all the solvents were tried with the following results:

OXIDE A.—*Total Sulphur Previously Found* 15.91 *Per Cent.*

Solvent.	Carbon Disulphide. Per Cent.	Carbon Tetrachloride. Per Cent.	Petroleum Ether, Ether, Acetone.
Soluble sulphur....	12.92	12.69	Extraction very slow and
Fixed sulphur	2.99	3.22	incomplete, only the lighter
Tar.....	9.74	9.17	oils of the tar were removed.

OXIDE B.—*Total Sulphur Previously Found*, 21.72 *Per Cent.*

Solvent.	Carbon Di-ulphide. Per Cent.	Carbon Tetrachloride. Per Cent.	Toluol. Per Cent.
Soluble sulphur.....	17.80	17.82	18.47
Fixed sulphur..	3.92	3.90	3.25
Tar.....	9.56	8.21	9.03

OXIDE C.—*Total Sulphur Previously Found*, 14.17 *Per Cent.*

Solvent.	Carbon Disulphide. Per Cent.	Carbon Tetrachloride. Per cent.
Soluble sulphur.....	11.13	11.52
Fixed sulphur.....	3.05	2.65
Tar.....	9.91	8.05

The results of the above would indicate that petroleum ether, ether and acetone would not answer as they do not remove all the tarry matter. The extractions with these solvents were carried to a point where the solvents were not colored by contact with the material, and it was plainly evident that only the lighter oils were removed so the operations were discontinued. Toluol is a good solvent for both sulphur and tar. Its vapor is inflammable but the high boiling point (111° C.), makes it easy to condense, so there is not much danger on this account. It is better adapted to "Method I," than "Method II., because in the latter the high boiling point may cause a loss of both sulphur and light oils when the solvent is distilled off from the contents of the flask. It is slower in its action than carbon tetrachloride or carbon disulphide.

Carbon tetrachloride is a very good solvent, it is more rapid than toluol but slower than carbon disulphide, and its non-inflammability makes it very safe to use.

Carbon disulphide is the best solvent. It may be safely used, provided precautions are taken. By heating the flask on a small sand bath with a low flame, and having a long air condenser over the extractor condenser, none of the vapor will escape at the top. Its low boiling point (46° C.), enables the expulsion of the last traces to be readily accomplished. It is best to use it freshly distilled to insure its freedom from sulphur.

The extraction of purification material, no matter what solvent is used, is a lengthy operation, and it is difficult to determine when it is complete. It was noticed that, when the extraction had been proceeding for several hours after the solvent had become colorless, on turning out the light and allowing to stand all night, the solvent around the cartridge would be found colored in the morning, indicating traces of tar. To test the completeness of the extraction successive solvents were tried; viz.:

OXIDE D.—*Two Tests.*

I.—Extraction with CS_2 followed by CCl_4.
II.—Extraction with CCl_4 followed by CS_2.

First extraction— I.	Grams.	First extraction— II.	Grams.
Material taken.....	10.	Material taken.....	10
Removed by CS_2.....	2.157	Removed by CCl_4.....	1.9145
Second extraction—		Second extraction—	
Material from first taken	5.921	Material from first taken	6.08
Removed by CCl_4.....	0.162	Removed by CS_2	0.0995

Either the carbon disulphide or the carbon tetrachloride methods may be used for works control. The latter is about 50 per cent. longer in time than the former. The length of time depends, of course, on the percentage of sulphur and tar. Usually an extraction started at 9 A.M., and allowed to proceed until the next day at noon, will be complete enough for practical purposes. The attempt to remove tar without at the same time removing sulphur was a failure because every solvent tried removed some sulphur. Sulphur evidently exists in the purification material from carbureted water gas in the following forms:

1. Sulphur in combination with iron.
2. Sulphur in combination with tarry matter.
3. Sulphur uncombined, and possibly dissolved in the tarry matter.

The Lighting of Factories and Workshops.

[Communicated by "LONDON."]

The general principles to be adhered to in the lighting of facturies and workshops have often been discussed, but as the subject is a wide one much remains to be thought out. In these notes it is intended to discuss more essentially the rival claims of artificial illumination, more particularly for engineering and allied buildings. The three principal illuminants are gas, oil and electricity; it will at once be admitted that there is considerable difficulty in making a reliable comparison. As a basis a given typical workshop may be taken, with bays of different width, to enable a common estimate of illuminating costs to be made. Experts may suggest that it is impossible to compare rival systems solely on the basis of the cost of a certain average intensity of illumination, such as 1.5-foot candles. One expert may much prefer to compare costs on the basis of the number of men at work; he may suggest that illumination, at least under the conditions generally found in an engineering works, should be

(*Continued on page* 162.)

THE AMERICAN GAS LIGHT JOURNAL

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NEW YORK, MONDAY, MARCH 10, 1913.

[Official Notice.]

Annual Meeting, Indiana Gas Association.

Office of the Secretary,
Indianapolis, Ind., Feb. 15th, 1913.

The Annual Meeting of the Indiana Gas Association will be held at the Claypool Hotel, Indianapolis, Wednesday, March 12th, and Thursday, March 13, 1913. The sessions will begin promptly each day at 10 A.M. The afternoon of Wednesday, March 12th, the members of the Association will go in a body to the Exhibit of Industrial Gas Appliances in the Indianapolis Gas Company's display room, 37 South Pennsylvania street, leaving the Claypool Hotel promptly at 1:45 P.M. The list of papers to be contributed and discussed is as follows:

"Workmen's Compensation," by Mr. O. O. Thwing.
"Benefits of Gas to the Public," by Mr. A. S. Cooke.
"Motor Trucks," by Mr. G. M. Dolley.
A paper by Prof. Frank Mathers, of Indiana University.

The Bureau of Information will present its report, including the correspondence which has been received and dealt with during the year.

At 6:30 on the evening of Wednesday, March 12th, there will be an informal dinner (no dress suits) at the Claypool Hotel.

Respectfully, Philmer Eves,
Secretary-Treasurer.

BRIEFLY TOLD.

Ninth Annual Meeting, Illinois Gas Association.—While Secretary Clark has evidently forgotten that the Journal is a pretty good source for spreading the light in respect of giving wide publicity to anything, in that he has not even sent us a line respecting the meeting this month of the Illinois Gas Association, we nevertheless have managed to get this much advance news regarding the sessions. The meeting will be held in Chicago, the 19th and 20th days of this month, under the Presidential direction of Mr. H. O. Channon. The headquarters will be in the La Salle Hotel, and in that handsome, well-appointed hostelry the meeting will also be held. As to the entertainment features of the meeting we can only say positively that a banquet will be held in the La Salle, the evening of the 19th. A prominent feature of which will be either a vaudeville or cabaret diverson. The paper list carries the following numbers:

"The Education of the Gas Company Employee," by Mr. E. C. Reinicher.
"A Convenient and Reasonably Accurate Photometric Standard," by Mr. H. L. Farrar.
"How to Develop an Ideal Complaint Man," by Mr. W. F. Yardley.
"The Possibilities of Gas as an Industrial Fuel," by Mr. F. F. Cauley.
"Gas Purification," by Mr. A. S. B. Little.
"Promotion of Friendly Relations Through Educational Publicity," by Mr. H. J. Gondon.
"Report of Committee on Accidents," by Mr. L. H. Johnson.
"Report of Committee on Public Relations," by Mr. H. O. Channon.

We understand that printed copies of the papers named have been mailed to the members, but the Secretary seems to have considered that the Journal should not be honored with a consignment. Perhaps it was only a mere overlooking. In any event we much regret not having been advised by the officers in a direct way of that which had been arranged.

A Joint Meeting of Positive Value.—On Thursday next there will be brought off in the meeting room of the Illuminating Engineering Society (New York Section), 29 West 39th street, a joint session, the other participants being: The New York Association for the Blind, through its Committee on Prevention of Blindness, and the American Society of Mechanical Engineers. The inciting cause of the convocation is the desire to discuss thoroughly and concertedly the live and appealing subject of "Industrial Lighting, Covering Its Relation to the Illumination of Machinery and Manufacturing Processes." It is little short of surprising that such scant attention has been given to this vast subject, the closeness of which to our everyday life is manifest. But anomalies exist in every phase of life as it is, and it is reassuring to know that one of these is to be sundered through the close and active attentions of the Illuminating Engineering Society. This move by it to a certainty justifies the existence of that body more than ever, and even if its activities were confined to the simple matter now in hand its exceeding value to the world at large must be admitted and acknowledged. The papers listed, with their authors, are these:

"Eye Strain and Light," by Dr. A. M. Alger, of the American Museum of Safety.
"Mechanical Safety," by Dr. W. H. Tolman, American Society of Mechanical Engineers.
"Industrial Lighting," by Mr. Ward Harrison.

The papers will be freely illustrated by means of lantern slides. The American Society of Mechanical Engineers will join the Illuminating Engineering Society in an *a la carte* dinner at Keene's Chop House, 70 West 26th street, at 6:15 P.M., directly preceding the meeting. Those intending to be present will confer a favor on Mr. Clarence L. Law, Secretary of the Society, if they will notify him immediately of such intentions.

Interesting Its Employees in a Financial Way.—Under date of February 24th last President Thomas N. McCarter, President of the Public Service Corporation of New Jersey, sent a letter to each of its army of employees offering from 1 to 100 shares of the Corporation at the quotation of $115 per share. The plan of selling the stock to the employees—for that is virtually the meat of the President's offer—is thus based: At the outset the purchaser pays $5 in cash for each share allotted, and thereafter he pays $1.50 per share per month. Tha Corporation has arranged with the Fidelity Trust Company to loan to purchasers the balance of $110 per share, on the purchaser's note, with interest at the rate of 5 per cent., the stock certificate issued to the purchaser to be deposited with the Fidelity Trust Company as collateral for said loan. Thus the purchaser becomes at once a shareholder and will receive the present rate of dividends at 6 per cent. per annum.

The Gas Industry in Russia.—A correspondent, writing from St. Petersburg, Russia, under date of February 22d, commenting on the investment of German capital in Russia gas works, brings to light some interesting matter. He avers that, in a study which has just appeared in St. Petersburg, on the part played by foreign capital in Russian industry, it is shown that Germany is interested to an extraordinary extent in the very limited coal gas industry of Russia. It was shown for example that, on January 14th, 1911, the German Companies operating in Russia for the production and sale of illuminating gas numbered four, the combined capital of which amounted to 12,500,000 roubles, or $6,615,000. There are not to exceed a total of 10 companies in the whole Empire, and as the combined capital of these Companies amounts to no more than 17,000,000 roubles, or $9,045,000, it can be clearly seen to what extent Germany controls gas manufacture and sale in Russia. But the part played by the foreigner in Russia's gas industry is not limited to that of Germany. The shares are allocated as follows: German, 71.8 per cent.; French, 12.6 per cent.; Belgian, 7.4 per cent. Wherefore, Russia only appears as a holder of 8.2 per cent. of the total. As the statement referred to is designed to show more particularly the aggressive nature of German enterprise in the country, her operations there in respect to the gas industry are particularized as follows: The United Gas Factories Corporation, of Augsburg, has gas plants in Kalisch, Petrokof and Tomascheff; the Garden Gas Factories Company controls the gas plant at Libau; the German Continental Gas Lighting Company, of Dessau, operates the gas plant in Warsaw, and the owner of the gas works at Wilna and Kronstadt is the concern known as the Gas and Electricity Exploitation Company.

Illuminating Engineering Society, Philadelphia, Pa.—The February meeting of the Philadelphia Section, Illuminating Engineering Society, was held in the Engineers' Club, Philadelphia, the evening of February 21st. Preliminary to the meeting a dinner was served in the dining room of the Club, which was shared in by 46 members and guests. The meeting proper, which was directed by the Chairman, Prof. Rowland, was attended by 175 members and guests, several prominent architects and opthalmologists participating in the proceedings. The Secretary read the minutes of the January meeting of the Section, and also abstracted the record of the January session of the main body, the recital also giving a good idea

of that which had been accomplished by the other Sections during the month. Prof. Rowland introduced the speaker of the evening, in the person of Mr. Preston S. Millar, President of the Society, who presented a graphic lecture-demonstration on "Some Phases of the Illumination of Interiors." Having complimented the members on the substantial growth of the Society, he went on with the subject proper. He remarked that the demonstrations were all the plainer through being illustrated by the agency of the slides and the aid of a reproduction of 3 model rooms which could be easily equipped with different types of lighting units, and the aid of varying room decorations in emphasizing the points made. He remarked that the purpose of reflectors was not only to direct the light where it was wanted but also to keep the source out of the field of vision. In the first demonstration was shown a bare lamp, next a lamp equipped with an angle shade and then one equipped with a cove shade. The bare lamp allowed the light to be chiefly thrown on the side walls, and, being exposed to the eye, caused annoyance. With the angle shade the source was altogether shielded and the light was thrown in one direction. The opal angle shade threw most of the light downward. There had been a great change in efficiency and in types of reflectors. In former times the latter were mostly opaque, hence did not shield the lamp; but now the semi-translucent reflectors in service in the main hid the lamp. Reflectors, he remarked, should be properly designed by the application of optical laws. The demonstration of improperly designed prismatic reflectors was very instructive, in that these plainly showed how the light was improperly thrown or misdirected. Furthermore, the lamp might also be plainly seen. An opal reflector was shown which threw some light downward and some on the side walls. The third example shown practically threw all the light downward. The exemplifications were intended to show that the proper reflector should be selected with an eye single for the particular purpose intended; always remembering that the light source must be correctly located in the reflector. The next demonstration showed 3 globes of different densities. Through the first a crystal globe etched inside the lamp could be seen; the second example was a light opal, and the third a dense opal. While the dense globe cut down the efficiency in some degree, its appearance was more pleasing. Of course, room decoration played a large part in effective lighting. Rooms were shown, covered with medium and dark wall papers, and by contrast a card placed underneath the light in the dark papered room seemed brighter, but in reality it was not as bright owing to the increased reflection received on the card in the light papered room. Extremes in wall decoration should be avoided, and the walls should not be too bright. Where reflectors were used the importance of room decoration was minimized. The next demonstrafion showed 2 cards on each of which was the letter E. One card had a polished surface, the other a neat surface. In certain positions the letter cannot be seen on the polished surface due to specular reflection. Polished surfaced papers should be avoided, and where these were liable to be gloomy surfaces the light source should be so placed that the reflection was not in the eyes. The next demonstration had to do with table lamps. The correct position for reading, of course, was so that the reader's back was to the lamp. Then came a demonstration of a room lighted from exterior sources, as, for instance, daylight illumination coming through a window. This made an unsatisfactory form of illumination; persons in the room either had their faces in shadow or had to face the bright window, which was disagreeable. Neither was the room well lighted, part of it being in dense shadow. The next demonstration showed and compared forms of indirect lighting in which central figures were used to conceal the lamp from view, directing the light more or less to the ceiling. It had been found that direct light was lacking in diffusion and that indirect lighting had that feature. The ceiling, of course, had to be considered in indirect lighting, in that it was practically a reflector, and a white or cream shade ceiling gave the best results. In the semi-indirect system the lamp was a translucent bowl, part of the light coming through the bowl, part being reflected to the ceiling. The best features of the indirect systems were that the source is concealed and the light is diffused. Where such features were not required the direct system was preferable, since twice as much light was given on the table plane from the direct system in comparison with the indirect. Doctors Hoadley and Crampton and Messrs. Siranfeld, Carew, Bard, Dickey, Israel and Hare took part in the discussion, which debate brought out many suggestive points respecting the proper lighting of nurseries, hospitals, bedrooms and sick rooms, mainly by means of indirect lighting. At the close Dr. Crampton stated that the opthalmologists of Philadelphia proposed having a meeting early this Spring to discuss the lighting problems.

FEBRUARY MEETING, PHILADELPHIA GAS WORKS SECTION, N. C. G. A.—Mr. M. Gibbons-Neff, Chairman of the Publicity Committee of the body named in the heading, informs us that the February meeting was held Thursday, Feburary 27th, in the Auditorium of the Y. M. C. A. Building, No. 1421 Arch street. In the absence of President T. R. Elcock, who was called upon to address the New England Section, Vice-President S. H. Thompson presided. In a short business session it was announced that the "Annual Smoker" would be held Thursday evening, March 28th, at the Lu Lu Temple, No. 1337 Spring Garden street. The meeting was addressed by Dr. Russell H. Conwell. The success of the new policy of the Section, in securing outside speakers to address the meetings, was demonstrated by the large and enthusiastic audience. Dr. Conwell, on being introduced by Mr. Thompson, delivered his well-known lecture "Acres of Diamonds," in which he likened our opportunities to fields of priceless gems, and appealed to his audience not to let them lie ungathered. The principal points in his address were brought forth by many interesting experiences, in which the speaker led his audience from the banks of the Tigris to the gold fields of California. He impressed upon the members that success was dependent upon their individual efforts, and in closing he summed up his whole message with the words of Bailey:

"He most lives who thinks best,
Who feels the noblest,
And acts the best."

CURRENT MENTION—

THROUGH some unaccountable oversight the name of Mr. Carroll Miller was omitted in our editorial account of the proceedings of the New England Association of Gas Engineers from the Board of Directors for the current year.

THE Town Council of Highland Park, a thriving suburb of Richmond, Va., has granted the Henrico County Gas Company, of Barton Heights, Va., a 30-year franchise, gas to be delivered to the consumer at a net rate of $1.10 per 1,000 cubic feet. The gas will be manufactured in Barton Heights and supplied to the new territory through a 6-inch main. The officers include: Mr. L. I. Pollit, General Manager; Mr. F. L. Marshall, Superintendent; and William H. Matlack, Jr., Assistant Superintendent.

THE Winona (Minn) Section of "The Gas Meeters" held a second regular meeting the evening of March 3d, in the office and showrooms of the Winona (Minn.) Gas Light and Coke Company. Chairman W. F. Clausen and the wideawake Secretary (Mr. J. F. Gilfillan) managed the meeting with great success. The programme was quite a lengthy one and the session was notable for two set speeches, one by Mr. Thurston Owens, General Secretary of the organization, whose theme was "Lighting and Illumination;" the other by Mr. A. B. Gilfillan, who described the "Jewels" in the showroom, which were clocks. At the organization meeting (February 18th) gas meters formed the topic for discussion, and at the next session water heaters will be the vehicle for debate.

THE Gas Machinery Company, of Cleveland, O., has been awarded a contract for the installing of an 8 feet, 6 inches, double, superheater, carbureted water gas machines, to be erected in the plant of the Citizens' Gas and Electric Company, Waterloo, Ia. The present generating house will be extended and the new set will be placed alongside the existing 7 feet, 6 inches apparatus.

MR. FRED K. WELLS, Secretary of the New England Section of "The Gas Meeters," informs us that the next dinner of the Section will be held in Boston, Mass., at 6 o'clock the evening of to-morrow. The dinner will be served in the New American House, Hanover street near Haymarket square. As usual, the tickets are $2 each, and Secretary Wells is positive in declaring that any gas man, or gas appliance man, in the vicinity at that time will be heartily welcomed.

THE Treasurer of the Baltimore (Md.) Consolidated Gas, Electric Light and Power Company, on the 1st inst. notified the shareholders that the time set for exchanging the preferred stock for the common (share for share) has been extended to September 1st, 1913.

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

"*The Whole Kewanee Family*," is the title of a 32-page illustrated catalogue issued by the National Tube Company, embracing, with a short description, all their specialties.

The "*Jeffrey*" *Catalogue No.* 32-*A*, "*Coal and Ashes Handling Machinery in Power Plants*," *No.* 43-*A*, "*Coal Crusher*," *No.* 67-*D*, "*Rubber Belt Conveyors*," *No.* 69-*B*, "*Screens*." These are all beautifully illustrated and handsomely printed.

"*Report to the Municipal Assembly on the United Railways Company, of St. Louis*," by the St. Louis Public Service Commission. Known as Vol. 2, 1913. It contains, besides the Report, well put together diagrams, maps and tables.

"*The Hunt Noiseless Bucket Conveyor*," *Catalogue No.* 12-9.—A booklet of 64 pages, containing descriptions of the conveyors they have designed and installed, and their mechanical construction. Profusely illustrated.

"*Review of the Market for Sulphate Ammonia during* 1912."—A pamphlet of 40 pages issued by Bradbury & Hirsch, containing much of interest to the fertilizer trade.

(*Continued from page* 159.)

given mainly in the form of small local lights for each workman, and with consequently only a very moderate degree of general illumination, which would obviously serve no useful purpose, and would in effect be wasted.

Another expert, taking an entirely different view, may rely entirely on the illumination derived from comparatively high power gas or oil lamps, say of a 1,000-candle power each. A third expert might take a middle view between these two extremes, thus, whilst supplying a very considerable proportion of the required illumination from lamps of 1,000-candle power, he may also make use of a large number of 100-candle power gas lamps. The small gas or electric lamps for local lighting suggested by the first expert, would, of course, be very considerably less powerful than the smaller lamps of the third expert, as they would probably only range from 16 to 30-candle power.

It must be admitted that these differences appear, when first mentioned, to render a comparison extremely difficult, nevertheless they may be made to throw some light on the relative merits of gas, oil and electricity. Oil lamps with wicks are obviously so inefficient, in comparison with those burning oil vapor in a gas mantle, that the latter only need be seriously discussed for anything more than sign lights and occasional illumination. Incandescent oil lamps tend naturally towards large powers, hence they are most useful for general illumination of moderately large spaces. All high power lamps alike, whether gas, oil or electrical, should be placed at a considerable height, out of the range of vision of the workmen; it follows that they are most suitable for high shops; or, better still, for yard illumination.

All these considerations apply to high power gas lamps and electrical arcs; but more especially to the latter, as they very rarely fall below approximately 2,000 candle power, in the case of the modern flame arcs, which experience has shown to be the best. Gas has an undoubted advantage as the economies of high pressure gas lighting can be obtained with lamps of much lower power, so that this illuminant can be applied with more success to the ordinary run of engineering work. Many foremen prefer incandescent gas lights of low candle power to the incandescent electric lamp for local machine lighting and floor work. It is true that these lamps are less efficient than flame arcs, but those recommending them assert that their only rival (the low pressure, small incandescent gas lamp) is less economical than the high pressure, and more powerful types; but this is not generally admitted by gas engineers. Electrical experts suggest that, with gas at 48 cents per 1,000 cubic feet, and electricity at 2 cents per unit, the cost of gas and electricity lighting came out about equal. If our competitors assert that, it is reasonable to assume, that with expert advice, gas should have an advantage. More costly than both, is the use of oil, especially with oil at present prices. When the local conditions permit of electricity being bought from a central supply station, for lighting only, it can very rarely be obtained for anything like so low a figure as 2 cents, and it may reasonably be suggested that, even when it can be obtained for both power and lighting at a low overall figure, the current used for lighting ought to be charged in the books of the firing at a higher rate than the remainder. The only commercial manner of testing that would be to request the supply company to state what reduction they would make, if current for lighting were excluded. Electricians assert that current need not be bought, but that it can be produced at the works. In the case of large engineering shops a separately driven dynamo could be employed, and the cost of the lighting current could then easily be calculated; but, for smaller works, the dynamo would naturally be driven off the line shaft and the estimation of the cost of the current, including all capital charges fairly chargeable to it, would not be an easy matter. Having regard to the fact that lighting current, whether bought from a central station, or generated at the works, would be a peak load, the suggestion that lighting current could be obtained at 2 cents per unit can only apply to exceptional cases, very favorably situated, and can scarcely be asserted as applying in every instance. Excluding the question of cost, the gas engineer can devote the whole of his attention to securing the most satisfactory illumination.

With regard to general principles, and the lines along which gas illuminating engineers should devote their energies and studies, it may be pointed out that the science or art of artificial illumination is still only young, and has at present by no means reached perfection. For most purposes in a reasonably constructed works day light illumination is undoubtedly far superior to any existing form of artificial lighting. Let us inquire why this should be so, for it may suggest ideas which may enable gas lighting engineers to perfect their system, and afford a clue to the direction along which illumination by artificial means should progress. Color naturally suggests itself as a factor of importance, and efforts are frequently made to copy the color of sunlight. The fact, however, that the human vision has been evolved during countless generations leading an outdoor life, with vegetable greens and light sky blues, together with some browns, as the prevailing colors, suggest that perhaps some faint but distinct color might prove an advantage in artificial lighting. We are on more certain ground when we attempt to imitate the mellow, diffuse quality of sunlight. Gas illumination should as far as possible approximate to an all-surrounding atmosphere, rather than to a series of diverging and fading pencils of hearthlight. Many experts attempt to obtain the former effect by means of shaded lamps and reflected lights from light colored walls and ceilings. Such a system must necessarily be costly, but it remains to be seen, whether or not, it may yet be developed as the only satisfactory method for general purposes, assisted necessarily by a limited amount of local illumination for special work. As a matter of more immediate practical importance it seems desirable to reduce glare to the narrowest possible limits. All illuminating engineers make that their first rule, and attempt to give effect to it by raising their lamps, more especially those of high power, as far above the line of vision as possible. When this is impossible, shades for cutting off the light in certain directions, or for diffusing it, are necessary. With regard to glare, gas has the advantage, and the greatest sinner is obviously the electric arc; and in spite of its efficiency it tends to disappear from engineering works, except where it can be set 40 or 50 feet above the floor, in a shop of moderate length. The intensity of the light affects the eye, it causes momentary blindness, which interferes with the work and may lead to accidents. It also makes other lights relatively dim and they may, therefore, have to be strengthened, involving additional and unnecessary cost. An intense light within the normal range of vision is evidence of faulty and thoughtless engineering on the part of the expert.

A Pleasant Reunion.

"The employees of the Central Hudson Gas and Electric Company," writes a correspondent, "one day last month, moved by that spirit which carries great corporations to the point where their being is virtually merged with that of the people or communities that they serve, to the mutual betterment of each, gave an exemplification of how to get together. The Pompeiian room of the Morgan House, Poughkeepsie, N. Y., was the gathering place, and 300 responded to the call. Enthusiasm was the keynote of the big event, which was a banquet tendered the men of the Newburgh Company's division by the men of the Poughkeepsie section; and the way in which the latter acted as host will be long remembered by their brethren of the 'Hilly City.' Newburgh sent up 75 to represent her. Of course, it was essentially fitting and truly appropriate that President Thaddeus R. Beal should be present to direct affairs, and he did so in a manner that savored not of 'the Boss' but of the real host. His introductory speech put all at ease, and likely his ears will ring for many a day to the echoes of the applause that followed his welcoming. Just as necessary to the occasion were Messrs. Ross Tracey, Louis Craner, William Cusack, 'Cop.' McTaggart and 'Dutch' Webber—the latter are known as the Rialto twins, due (so one of us said) to the fact that they are not related in any degree. According to the tastefully designed programme and menu, this part of the description should deal with the entertainment. However, it is left to the judgment of those who were there if it were or were not entertainment—to the mind of the writer the sketches had the 'movingest picture films' beaten by 500 rolls. 'Will.' McCourt and Paul Terpenning, both of whom are chanters sweet, were two of the 'cheer-up squad,' but their names were not on the programme, simply because their presence was entirely unexpected. Good work, eh! Well it surely was. Mr. H. M. Beugler, of the Poughkeepsie division, was another one who beautifully 'freed his mind,' and he certainly out-volumed J. M. Brock, of the 'Stove Brigade;' there was some doubt, however, if the laurels should not have been pressed on the wrists—no, not brow—of Mr. E. J. Harris, whose sweet reminder is that much heat from Acorns can be obtained! The upper left hand corner of the programme and bill-of-fare carried a star within a circle, and following each around the periphery were the letters forming the words 'Central Hudson Gas and Electric Company.' Across the star's face, blazoned in letters of gold was the word 'Service.' This is really that which the

Company performs in its highest and best sense, and which is taught in season and out to its men by their superiors. The banquet itself was far from being a 'light' (excuse me) repast. The programme specified that the affair was to be run off in seven heats; and, from grape fruit to cigarettes, the bill was redeemed in full, according to Mine Host Kohl's, well-known, altogether satisfactory practice."

New Methods and Appliances.

THE DEMONSTRATION OF INDUSTRIAL GAS APPLIANCES.[1]—[By MR. HERBERT K. DODSON, Commercial Agent, Gas Division, Consolidated Gas, Electric and Power Company, Baltimore, Md.]—The object of our industrial gas appliance department is to educate the people of Baltimore in the many uses and the proper application of gas to increase its use as a factory fuel, for there are many young industries in this city which will materialize into large manufacturing plants in the near future, as our city is rapidly becoming a manufacturing center.

To aid the industrial appliance department in creating a demand for the use of gas as a factory fuel, the building on the southeast corner of Park avenue and Saratoga street, has been fully equipped as a demonstration and salesroom for the many gas burning appliances to be used in factories.

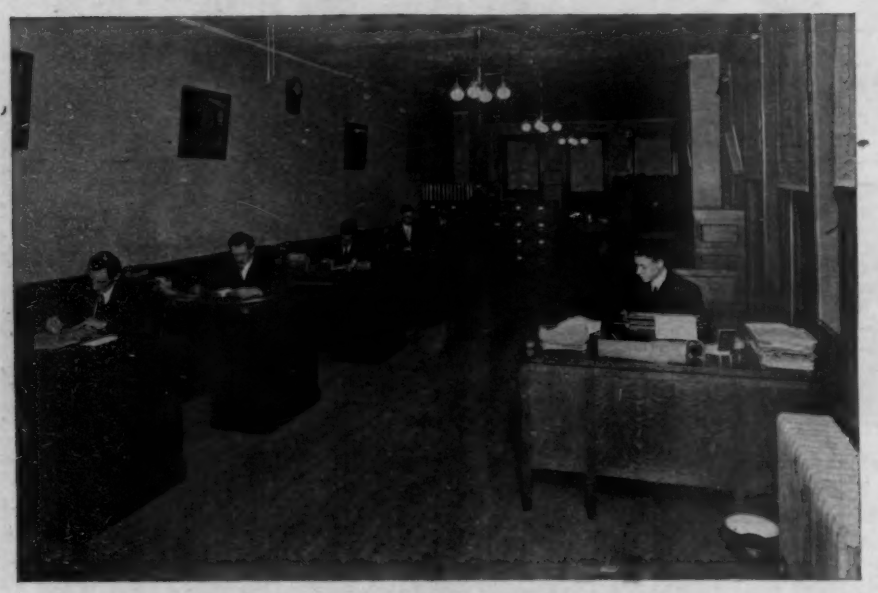
A 4-horse power gas engine of the most modern type is installed in the Saratoga street show window, and drives several large heating machines and a positive pressure blower, the latter supplying compressed air to the many burners and appliances displayed. In the Park avenue window is exhibited an automatically controlled gas fired steam boiler.

Three "burned through" gas meters are placed in different parts of the display room, equipped with special dials to register the consumption of any particular appliance supplied through these meters. All air, gas and water pipes connected to the various appliances are

General View of Demonstration Room, Industrial Gas Appliance Department.

1. From the Baltimore *Gas and Electric News*.

Office of Mr. W. A. Ehlers, M.E., in Charge of Industrial Gas Appliance Department.



Office of Industrial Gas Appliance Department.

General View of Demonstration Room, Industrial Gas Appliance Department.

exposed and painted different colors, so that they can be easily distinguished. The air pipes are painted red, the gas black, and the water white.

The pressure of the gas, water and air to an appliance plays an important part in the successful operation of the appliance, and to register these different pressures, a board equipped with gauges is placed in a convenient position for ready reference. At the same point is placed a pyrometer equipped with a 50-foot cable to register the temperature of the different flames and furnaces.

The building is illuminated by gas. The arcs on the outside are turned off and on from the inside of the building, while the lights surrounding the inside of the show windows are controlled by magnetic valves, which system permits the turning-off and on of the lights by the pushbutton system.

The display or demonstration rooms have not been officially opened nor advertised. They have attracted a great deal of attention, however, and many favorable comments have been received. During the month of January, several very good sales were made, including one which will mean an additional output of 14,400,000 cubic feet of gas per year. There are larger sales than this to be made in Baltimore, however, for it has been proven in thousands of cases that excellent results, both as to the work accomplished and the cost of operation, can be obtained by the use of gas for factory purposes, when care is exercised in its efficient application.

The various applications of gas for factory uses require both practical and technical knowledge in solving the many problems confronted, such as the kind, style and size of the appliance and the degrees of heat required to accomplish satisfactory results. The increased cost of competitive fuels and the reasonable price at which gas is sold, give the future of the industrial gas appliance department a very promising aspect. The industrial field for the use of gas is unlimited.

From time-to-time, the many appliances displayed in the industrial gas appliance department will be fully explained in "The News." Various demonstrations of annealing, tempering, brazing, baking enamel on steel plate, etc., will be given for the benefit of the employees.

An invitation is extended to all the employees and the public to inspect this most interesting and instructive department, which is open from 8:30 A.M. to 5:30 P.M. daily, and on Saturdays from 8:30 A.M to 10 P.M.

The success of the industrial gas appliance department will depend upon the co-operation of the entire organization of our Company. All suggestions for the application of gas for various purposes will be gratefully received.

THE LIGHTING OF THE ALLEYS DURING THE AMERICAN BOWLING CONGRESS.—[Communicated by MR. GEORGE DOWNS and Mr. A. H. GINDELE, of Toledo (O.) Railway and Light Company.]—All large cities of the United States are being represented at the Convention of the American Bowling Congress, now being held at Toledo, O., February 22d to March 15th, 1913. The attendance so far has averaged over 2,500, and as most of these are owners of bowling establishments, that was deemed a good opportunity for some publicity to demonstrate a gas installation that would produce the proper lighting effect.

We were not deterred in soliciting temporary business of this kind, although not a piece of gas piping was in place, and the electrical contractors had assembled to close the wiring contract with only 7 days ahead to complete the installation. Such was the proposition that confronted us. Our

perseverance and enthusiasm in talking artificial gas against grea odds; the guarantee to have the lights in place on time; the assur ance to give A-1 service, and an illumination that would have a pleasing effect to the eye, at a cost that could not be equalled by electricity; to so arrange the lamps as to entirely eliminate shadows, also to place them so that an unobstructed view could be had from the grandstand, won us this contract.

The installation will now be a permanent one, since the piping is so designed that it can be very easily and cheaply adjusted to meet the numerous conditions, which prevail in an exhibition hall of this kind. Heretofore each show required an entire new electrical outfit, at a great expense, on account of city electrical supervision.

The Hall is 85 feet wide by 285 feet long. The ceiling is 35 feet high, in center, sloping 25 feet at the side walls. It required over 1,330 feet of piping to complete the job.

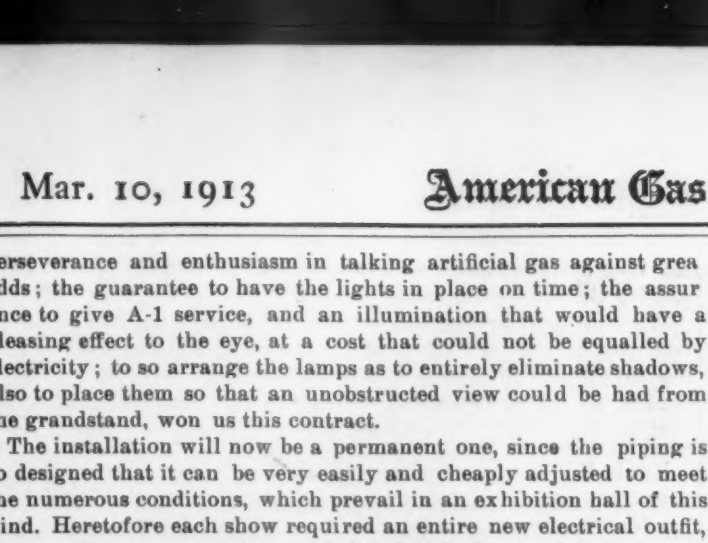
The lamp outfit comprises sixteen 2-light reflexoliers, with angle-shades over the 10 pins, located 2 feet back from the headpin and 3 feet above the alley, equipped with the "Hiray," ordinary size, white light mantle. Over the alleys and hall, fifty-one 3-burner, No. 30 inverted Humphrey gas arcs were placed. Of these, 21 were factory arcs with reflectors located directly over the alleys. The lamps were hung bow-shape, the end lamps being 20 feet and the center lamps 23 feet above the floor.

For this installation Mr. Gindele designed 2 special mantles, made extra strong, 2½ and 3 inches long, and of amber tint, which it is estimated increased the candle power about 20 per cent. The 2½-inch mantle is used on a No. 48 orifice, the 3-inch on a No. 46 orifice. The mantle plates were taken off the lamps, and a burner nose with lugs to support the mantles, was substituted.

The improvement is at once apparent. The mantle readily fills up and blends together in a solid mass of incandescence. It allows for a greater variation of pressure, and adapts itself to different changes in quality of gas. It does not carbonize so readily as the ordinary mantle, the gas having more room to expand. So far, the mantles have stood up well, being very durable and able to withstand sudden jar or vibration.

The consumption is about the same as in the ordinary mantle, or 10 cubic feet for the 2½-inch and 13 cubic feet for the 3-inch mantle, the pressure being 30-tenths.

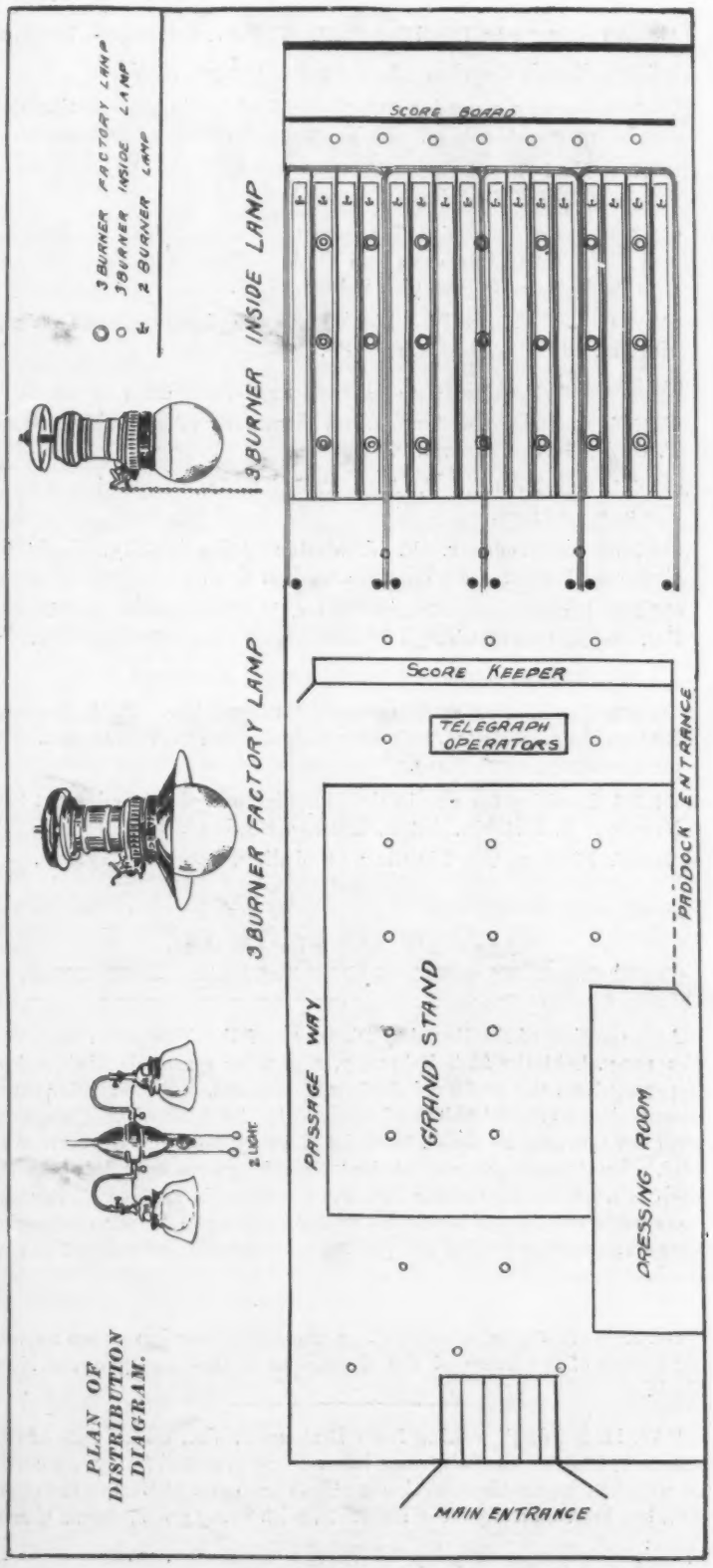
The photo taken at night (6-minute exposure) shows how well this installation made good. The reflexoliers over the pins were not lighted on account of the alleys not being completed at the time.



Grand Plan of Installation.

Mr. L. Gazzola, Secretary of the Bowling Tournament, says, "This is the 13th year of our Bowling Congress, and, having attended them all, am sure when I say that your gas installation is better than we ever anticipated, it being by far the best, the effect on the eyes more pleasing to the bowlers than any electrical installation we have ever had at our annual conventions. In consequence we expect to have world records made on these 16 alleys this year."

The diagram shows how lamps were distributed.



Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,052,471. Gas Control Cock. J. & W. Eyer, Toronto, Canada.

1,052,540. Valve for Gas Compressors and Pumps. A. J. West, Bethlehem, Pa.

1,052,541. Gas Compressor and Pump. A. J. West, Bethlehem, Pa.

1,052,622. Incandescent Gas Mantle. E. Ross, Barmen, Germany, assignor to The Firm of Internationale Gasgluhlicht Actien-Gesellschaft, Budapest, Austria-Hungary.

1,052,853. Separation of Tar and Ammonium Chloride Contained in Gases Produced by Distilling Coal. L. Solvay, Brussels, Belgium.

1,052,860. Mantle Carried. A. P. Storrs, Owego, N. Y.

1,053,004. Arrangement for Automatically Lighting and Extinguishing Lamps and the Like. M. V. Brondum, Aarhus, Denmark.

1,053,143. Fuel Gas Mixer. W. O. Altman, Kane, Pa., assignor of one-fourth to J. A. Johnson, same place.

1,053,349. Art of Removing Tar from Coal Gases. W. H. Blauvelt and C. G. Tufts, Syracuse, and C. A. Collins, New York City, assignors to Semet-Solvay Co., Solvay, N. Y.

1,053,369. Gas Controlling Mechanism for Instantaneous Water Heaters. J. Ellis, Pittsburgh, Pa.

1,053,370. Water Heater. J. Ellis, Pittsburgh, Pa.

1,053,456. Production of Ammonium Nitrate from Ammoniacal Gases. F. Uhde, Gerthe, Germany.

1,053,695. Gas Heater. S. Ash, Philadelphia, Pa., assignor to S. Klein, same place.

1,053,737. Gas Producer. F. V. Matton, Atlantic City, N. J., assignor to Camden Iron Works, Camden, N. J.

1,053,906. Instantaneous Water Heater. R. C. Frampton, Pittsburgh, Pa., assignor to Pittsburgh Water Heater Co., Allegheny, Pa.

1,053,982. Gas Purifier. C. Flossel, Munich, Germany.

1,054,461. Automatic Gas Lighter and Extinguisher. P. R. Seamon, Boston, Mass., assignor, by mesne assignments, to Automatic Lighting Company, same place.

1,054,620. Machine for Uus in the Manufacture of Incandescent Gas Mantles. J. I. Robin, Acton, London, England.

1,054,646. Distance Gas Lighting. S. Julian, London, England.

Items of Interest
FROM VARIOUS LOCALITIES.

AT a meeting of the Board of Directors of the Freeport (Ills.) Gas Company, held the 25th February, a regular quarterly dividend of 1½ per cent. on the preferred stock was declared, and checks for same were mailed to shareholders of record the 1st inst. The Company has been operated by the C. H. Geist Corporation since September 1, 1912, wherefore it appears that the "Geist" type of energy is making itself felt. Since September last the Company's trading shows an increase in the elapsed 6 months approximating to 10 per cent. over the corresponding half of the prior twelvemonth, the sales of gas in the last 6 months having gone to a total of 60,000,000 cubic feet.

DR. E. G. LOVE, on March 1st, assumed the direction of the chemical section of the forces of the Consolidated Gas Company, of New York.

"W. H. M., Jr.," writing from Richmond, Va., under date of the 28th ult., incloses the following letter (several useful follow-up cards go with it) that the Henrico County Gas Company, of Barton Heights, Va., has been mailing to the residents, with many good returns therefrom:

Dear Madam: We are desirous of getting as many gas ranges as possible installed before the spring rush; so, for the next 10 days, we make you this special offer. We will install in your house, free of charge to you, a gas range, allowing you to try it for 30 days. At the end of the 30 days, if you desire to keep the range, you will pay us, as well as the gas used, according to our regular rules. If you do not desire to keep it, we will remove the range and pipes. The only charge you will have incurred will be for the gas consumed.

We could not make this offer if we did not believe that the gas range, once in the kitchen, would remain. Gas is the modern means of causing cooking to be a pleasure. No coal to carry; no ashes to remove; you can sleep later in the morning. Ignite a match and instantly your fire is ready—a hot fire, a slow fire, or a medium fire, just as you wish at the time.

We have ranges from $17 up; cash or installment terms. With every range purchased from us we will give 50 feet of service pipe, free, up to and including connection of the range. We charge 10 cents per foot for all service pipe in excess of 50 feet, up to and including the connection of the range.

We want to avoid the Spring rush. You have nothing to lose; in fact, you have everything to gain. Stoves will be connected according to priority of orders. We have already connected over 100 houses, so ask your neighbor about gas for cooking, lighting and heating.

MR. S. P. VECKER, formerly with the Old Colony (Mass.) Gas Company, and also with the American Gas Company, at Philadelphia, has been appointed Manager of the Key West (Fla.) Gas Company.

A RECENT issue of the *Journal fuer Gasbeleuchtung* carries an interesting resume of the German Gas and Water Association, the recounting of "Members and Memberships" (the latter meaning gas companies or municipal gas undertakings that pay dues and send a delegate to represent them at the meetings), and there are 910 "Participators," meaning that the two former sorts of members have 910 representatives. Again, there are 5 honorary members and 200 "extraordinaries," or a total of 1,118. The General Society is quite like our American Gas Institute as to standing, rules and procedure, and 8 other gas associations are represented in the general body.

THE Arlington (Mass.) Gas Light Company has notified the authorities that on and after July first the net rate for gas shall rule at $1.15 per 1,000 cubic feet.

WE are informed that Mr. Frank T. Fowle has severed his connection with the "McGraw Publishing Company" as one of the editors of "Electrical World," and will resume his electrical engineering practice, with offices in 68 Maiden Lane, Suite 702, New York.

THE Rector Vacuum Gas Heating Company, of Baltimore, Md., was incorporated at Dover, Del., some days ago, by Messrs. L. Lloyd, L. Jackson and Albert Diggs, of Baltimore, and Henry W. Davis, of Wilmington, Del. The concern is capitalized in $250,000, and the purpose is "to market and install in Baltimore a series of gas appliances for heating known as the 'Rector System.'"

MR. JOHN T. OAKLEY, who was Commissioner of the Department of Water Supply, Gas and Electricity, New York, during the term of the administration of Mayor George B. McClellan, died, at his home in New York, the morning of February 27th. He was a Sachem of Tammany Hall and had been Chief Clerk of the Board of Aldermen. He was in his 50th year, having been born in New York City November 16th, 1863.

MR. J. HENRY EDMUNDS, for a long time Superintendent of the Cape May (N. J.) Gas Company, died at his home in Cape May, the night of the 23d ult. He was in his 67th year, and served Cape May as its Mayor, from 1885 to 1897, consecutively.

AFTER May 1st the net gas rate in force by the Perth Amboy (N. J.) Gas Light Company will be 90 cents per 1,000 cubic feet. President Convery hopes that this concession will prompt the citizens to use gas more liberally and generally than has been their custom. A hope that should come true, especially since gas at 90 cents in the place named, particularly when consumed through an incandescent mantle, will be far cheaper even than kerosene illumination obtained through the agency of the ordinary kerosene lamp.

"AT the annual meeting of the Dayton (O.) Gas Company the reports showed that the past year's trading was the heaviest shown by the records for any twelvemonth. It was determined to expend a considerable sum on main extensions. The officers elected were: Directors, B. F. Weidler, Joseph Light, Arthur C. Dickey, E. W. Hanley, R. R. Dickey, G. W. Hood, H. C. Graves, W. B. Gebhart and C. B. Oglesby; President, Edward H. Hanley; First Vice-President, H. C. Graves; Second Vice-President, C. B. Oglesby; Secretary and Treasurer, B. F. Weidler; Assistant Secretary and Treasurer, W. B. Gebhart. The probability further is that a sensible addition will shortly have to be made to the generating capacity of the plant. The Company is now safely ensconced in its handsome new office quarters in the McIntire Building.—F. V."

MR. G. W. FALLER, for quite a while in the service of the Denver (Col.) Gas and Electric Light Company, has been appointed General

Superintendent of the City Light and Water Company, of Amarillo, Tex.

THE annual meeting of the engineers and superintendents of the American Light and Traction Company was held in Detroit, Mich., the last week in February. It was largely attended; but beyond that statement we are unable to go, these meetings being conducted on lines that restrict the doings to and for the benefit of those directly concerned.

"DEAR JOURNAL: While it may not be directly in line with your ideas of news matter, still I venture to send on the story in brief shape, in that its details go to show the heroism of a gas man, formerly fairly well-known to the fraternity of the New England section. Mrs. George B. Spring, wife of a former Superintendent of the Clinton (Mass.) Gas Light Company, had long been a sufferer from anaemia, for the cure of which she had been treated in a private hospital in Newton, Mass., came to so low a condition that transfusion was resorted to as a last resort. The necessary blood was drawn from the veins of Mr. Spring, but the trial was unfortunately unsuccessful, the patient dying from collapse. The effect on Mr. Spring was so serious that weeks elapsed prior to his regaining his normal condition.—B. M. B."

MR. JOHN WILSON, formerly foreman of the Old Colony (Mass.) Gas Company, has been appointed Superintendent of Distribution, Key West (Fla.) Gas Company.

JOHN HUNT, whose age is 22, was recently up in the Criminal Court, Pittsburgh, Pa., before Judge John C. Haymaker, confronted by 18 charges of burglary and 1 of larceny, all involved in the robbing of prepayment gas meters, coupled with other purloinings of household goods. He gained access to the plundered places in the guise of a meter reader. Before the trial had proceeded any length he pleaded guilty to all charges, whereupon Judge Haymaker ordered him put away for a period of 19 years.

MR. DAVID KIDNEY, for several years connected with the Consolidated Gas Company, New York, died at his home in Bay Ridge, Brooklyn, N. Y., the morning of the 24th ult. He was in his 69th year, having been born March 12th, 1844. He is survived by 1 son, 7 daughters and 22 grandchildren.

THE Consumers' Gas Company, of Reading, Pa., has reduced its net selling rate to 90 cents per 1,000 cubic feet; $1 gross, 10 cents off for payment within 10 days.

THOSE who would secure or obtain gas literature of a standard sort, on everyday matters connected with gas manufacture and supply, can put in a stock sufficient to fill a shelf or two in a fair-sized bookcase. For instance, the American Meter Company has publications on hand relative to the subjects named, which it is ready to forward on request: Apparatus, calorimetry, meters, ordinary and prepayment; provers, photometry. Manager W. B. Harrington proclaims himself ready to give any information in respect of the said publications that enquirers may desire.

DURING the year the improvements made upon the plant of the Kalamazoo City (Mich.) Gas Company have entailed as a cash outlay not very far from $40,000. The new station meter was put into satisfactory operation some days ago, and the purifying plant—thoroughly modern and up-to-date the system is—will be ready for use by April 1st. The Company's plant is now in first-class shape; but its big—both in mind, heart and body—owner will not be content until at least two more of the nearby settlements are piped.

THE proprietors of the "Dime" Bank Building, Scranton, Pa., through the importunings of Cashier Dunham, abetted by the arguments of General Manager Stack, of the Scranton Gas and Water Company, have consented to Mr. Dunham's proposition to cause the exterior of their beautiful banking structure to be one of the pleasing sights of the night in that bustling city. Accordingly all the prominent frontage lines of the building are banded by gas arc lamps enclosed in lanterns of the Louis XV. type, the material of the frames being hammered copper-bronze, from designs by Manager Stack. The lanterns are suspended from massive ornate brackets of wrought iron, the latter having been planned by Architect Davis to harmonize with the lines of the building. Really, the effect is remarkably attractive and effective.

"M. V. M.," writing from Jackson, Miss., under date of the 28th ult., says that at a joint meeting of the committees named by the Mayor, the aldermen and the members of the Business League, of Greenwood, Miss., to consider the matter of a gas works for Greenwood, the opinion was general that the citizens are in favor of such a plant, and the committee declared such an installation had become a necessity. Having had a liberal exchange of opinion respecting the situation the committee adjourned, subject to the call of the Mayor. Meanwhile the same committeemen will visit different Southern centers with the view to inspecting the gas plants in such localities, to consider the matter of rules that could or should be charged; in fact, to make a thoroughly practical examination of all the features involved by the situation and its surroundings.

THIS narrative will likely interest all of the old-timers in this vicinity, for Mr. Orth was, in his day, well-known to the gas men of Brooklyn and New York: "I venture to send this little narrative regarding the death of Mrs. Elizabeth Orth Colston, widow of James H. Colston, who passed away at her home 488 Tenth street, Brooklyn, in her 95th year. Lovable to the very last was the deceased; and her wonderful activity at such an advanced age made many marvel. She was born in Frankfort, Germany, August 22d, 1818, but came with her parents to Brooklyn when in her 6th year. In her 20th year she married James H. Colston, and their lengthy harmonious companionship was terminated by his death (in 1903) when in his 99th year. He was the first Cashier of the old Brooklyn Gas Company, and was in its employ for 60 years, or until he was pensioned in the early 80's. Deceased was an attending member of the Episcopal Church of St. John, Diocese of Long Island. Her wonderful vitality was maintained to the very end, sight, speech, hearing, locomotion, in fact all faculties being actively exercised by her. A daughter, 2 grand children and 4 great grand children survive her. —B. T. H."

THE contention over the gas rate charged by the Southern Counties Gas Company in its Orange (Cal.) district was threshed out in Orange last week, before Messrs. John M. Eshleman and H. B. Loveland, of the State Board of Railroad Commissioners. The hearing was had at the instance of the Company, who petitioned for permission to raise its net selling rate to $1.35 per 1,000 cubic feet, instead of $1.15 as at present. Secretary Walter F. McFarland, of the Company, asserted that, at the existing rate, the corporation had largely increased its business during the year closed, as compared with the previous year, but that its earnings steadily decreased as the output increased, which of itself was ample proof that the rate was too low. The business had been conducted at loss of $260 for the twelvemonth, whereas if the rate prevailing in 1911 ($1.40 per 1,000) had been maintained a profit of close to $5,000 would have been shown. The labor rate, he said, was chiefly responsible for the difficulty of making both ends meet under the present schedule. The Commissioners took the matter under advisement.

LAST month Mr. J. Arnold Norcross, Secretary of the New Haven (Conn.) Gas Light Company, sailed for Europe, the object of his journeying being an investigation of the latest processes of manufacturing gas—especially in respect of the vertical and chamber oven types. He will be home by April 10th.

SUPT. FRANK HELLEN, of the gas distribution division of the trading of the Rochester (N.Y.) Railway and Light Company, estimates that the corporation's needs in respect of pipe extensions and renewals for the near future will require 24 miles of pipe. Hereafter no distributing pipe less than 6 inches diameter will be laid in Rochester.

THE death, in Clyde, N. Y., early last month, of Mr. William Nichols has just been reported to us. Born in Bennington, Vt., January 16th, 1840, he removed to Clyde with his parents in 1842. He eventually became identified with the milling industry and was widely known throughout Central New York. In 1851 he assisted in forming the Clyde Gas Company, in which property he had an interest for many years. He was a veteran of the Civil War, serving with the 111th New York Volunteers from August 5, 1862, until the close of the strife. Notable in his experiences while in the army was his imprisonment during the melee at Harper's Ferry, and nearly a year spent in the Saterlee Hospital, Philadelphia, from illness caused by exposure subsequent to the battle of Gettysburg. His wife (who survives) enlisted with her husband as a nurse, serving as such until peace was declared. He was a prominent member of Snedaker Post, G. A. R., and had been sexton of the Clyde M.E. Church for 50 years.

The Market for Gas Securities.

The market for city gas shares, in common with the rest of its listed companion, is a trifle stronger, as a result of the week's trading. The quotations this noon (Friday) are: Bid, 131½; asked, 132. The Company's affairs are in great good shape just at the time.

Brooklyn Union is 130 to 134. The regular dividend of 1½ per cent. was declared by its Directors the close of the last week in February. It is payable April 1st to shareholders of record as of the 15th inst. The Byllesby interests in Louisville, Ky., have been taken over by a holding concern, incorporated under the laws of Delaware, entitled the Louisville Gas and Electric Company. It is capitalized in $18,000,000, and it eventually will control the gas and electric lighting, heating and powering fields of Louisville. The Highlands Gas and Fuel Company, of Philadelphia, authorized to operate in Bucks County, Pa., has filed articles, announcing a capital stock of $150,000.

The regular quarterly dividend of 1¾ per cent. on the common stock of the Laclede Gas Light Company, St. Louis, Mo., is payable the 15th inst.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

MARCH 10.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$99,816,500	100	131¼	132
Central Union Gas Co. — 1st 5's, due 1927, J. & J.	3,500,000	1,000	103	105
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	3,500,000	100	173	177
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	101	103½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	59	61
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	99½	101
Standard	5,000,000	100	69	70
Preferred	5,000,000	100	90	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	130	134
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¼	5-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	97	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	85
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	87	90
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	18,460,084		118¾	119
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,661,000	—		—
Con. Gas Co., Baltimore City, 4½	2,751,000	—		—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	94	96
Bonds	75,000	—	—	100
Detroit City Gas Co.	6,580,000	—	—	50
Detroit Gas Co., 5's	381,000	1,000	75	80
" Prior Lien 5's	5,619,000	1,000	97	100½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	133	136
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	130	133
" Bonds, 5's	10,500,000	—	104	106
Indianapolis	2,000,000	—	38	45
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	91	
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	98½	99
Laclede Gas Co., St. Louis.	10,000,000	100	99½	100
Preferred	2,500,005	100	99	102
Bonds	10,000,000	1,000	102¾	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	120	130
Madison Gas and Electric Co. " 1st Mtg. 6's	400,000	1,000	106	
Massachusetts Gas Companies, of Boston	25,000,000	100	89¾	90
Preferred	25,000,000	100	94	94¼
Montreal L. H. & P., Canada	9,000,000	100	235½	236
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	5,000,000	25	189	190
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	112	113
1st Mortgage	20,100,000	1,000	102	103½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
Pacific Gas and Electric Co.	15,500,000	—	58½	60
St. Joseph Gas Co.— 1st Mtg. 5's	1,000,000	1,000	96	98
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	105
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	427½	428
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, Richmond, Va., October 15-17, 1913. Officers: President, W. R. Addicks, New York City. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting Sept. 1913. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 8, 1913. Officers: President, C. G. M. Thomas, Long Island City, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Gas Meeters.—Monthly Section Meetings; Grand Commissioner, I. W. Petty, New York; Gen'l Sec'y, H Thurston Owens, La Crosse, Wis.; New York Section, Chairman, Will W. Barnes; Secretary, A. M. Berg, Sip ave., Jersey City, N. J. Philadelphia Section; Chairman, L. R. Dutton; Secretary, H. F. Patterson, Jr., 331 Chestnut street. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz. East Ohio Gas Co. New England Section, Chairman, F. M. Roberts, Haverhill; Sec., F. K. Wells, 69 Broad street, Boston.

Guild of Gas Managers of New England.—Annual meeting, March, 1913. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 19th and 20th, 1913. Chicago, Ills. Officers: President, H. O. Channon, Quincy, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting,———— September, 1913. Meetings of Sections, monthly. Pres., Preston S. Millar; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March 12 and 13, 1913. Indianapolis. Officers: President, Howard L. Olds, Indianapolis; Vice-President, Wm. Wallace, Lafayette; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, May 22, 23, 24, 1913; Burlington, Ia. Officers: President, C. W. Fair, Atlantic, Ia.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1913. ———— Officers: President, L. O. Ripley, Emporia, Kas.; Secretary and Treasurer, W. H. Fellows, Leavenworth, Kas.

Michigan Gas Association.—Annual meeting, September——1913; ———— Officers: President, W. S. Blauvelt, Detroit, Mic; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1913; Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting and gas show, Dec. 1-6, 1913. Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, Cleveland, O., May 20 22, 1913; Officers: President, M. B. Daly, Cleveland, O; Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 18th and 19th, 1914 Boston. Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Annual Meeting, April —, 1913, ———— N. J.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn Belmar, N. J.

Ohio Gas Association.—Annual meeting, February ————, 1913, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City May, ——1913. President, F. W. Caldwell, Shawnee, Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, San Jose, Cal., September 16, 17, 18, 1913. Officers: President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, Henry Bostwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, York, Pa., April 9-11, 1913; Officers, President, H. H. Ganser, Norristown, Pa.; Secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city

Southern Gas Association.—Annual meeting, Charlotte, N. C., April 16-20, 1913, Officers: President, C. E. White, Montgomery, Ala.; Secretary-Treasurer, R. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. May 21, 22, 23 and 24, 1913, Galveston, Tex. Officers: President, F. M. Lege, Jr., Galveston, Tex.; Secretary H. S. Cooper, 405 Slaughter Bldg., Dallas, Tex,

Wisconsin Gas Association.—Annual meeting, May 14 and 15, 1913, Milwaukee, Wis. Officers: President, I. F. Wortendyke, Janesville, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.